

Alameda Flood Control Channel

TSN:ISP-2004-01

Complex Description:

The Alameda County Flood Control Channel (ACFCC) is a large, unlined, trapezoidal channel that runs from east to west through Hayward, Alameda County, draining a nearly 800 square mile watershed into the San Francisco Bay. The levees on both sides of the ACFCC are topped with multi-use public trails that are part of the San Francisco Bay Trail, Alameda Creek Regional Trail and Coyote Hills Regional Park. Downstream from Union City Blvd/Ardenwood Blvd., to the north of the northern levee, are inactive commercial salt ponds, with an East Bay Regional Parks District Alameda Creek Stables Staging Area trail access and parking lot. To the south are more inactive salt ponds, seasonal wetlands, and Coyote Hills Regional Park. Upstream from Ardenwood Blvd., there is residential development on either side of the levees, but there are currently no housing units, schools or other similar facilities downstream of Ardenwood Blvd.

Within the levees, which are set approximately 100-200 meters from the channel, are broad benches of accreted sediment, forming a marsh plain through which the stream channel meanders. These tidally influenced marsh plains were largely monocultures of invasive *Spartina* before treatment began in 2005. The marsh plain is now dominated by low marsh *Spartina foliosa* habitat nearer to the channel, and pickleweed (*Sarcocornia pacifica*) habitat farther away from the channel. There are short stretches of mudflats in the downstream areas near the channel. The width of each of these zones is greatest toward the channel mouth (downstream of Coyote Hills), diminishing as the channel proceeds upstream and becomes narrower. The combined infestation of the six sub-areas of the Alameda Flood Control Channel (particularly the large infestations at sub-areas 01b and 01c) historically comprised one of the largest *S. alterniflora* hybrid infestations in San Francisco Bay. The ISP's 2004 mapping effort estimated a total of roughly 200 contiguous acres of *S. alterniflora*/hybrids on this site spread over approximately 470 acres (32%) of salt marsh and tidal mudflats. Pond 3, part of the Lower Channel sub-area of this site, was the original introduction site of *Spartina alterniflora* in the mid-1970's as part of an Army Corps of Engineers experiment in bank stabilization. Most of the invasive *Spartina* in this site complex is downstream of Ardenwood Blvd. (4 miles from the mouth) where salinities are still high enough to exclude bulrush and tule that can out compete *Spartina* in fresher water.

Sub-Area 01a: AFCC Channel Mouth

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; Saul Ferdan, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Description

The 39-acre channel mouth sub-area (01a) encompasses the channel and Bay shoreline marshes westward of the ends of the levees on either side of the channel mouth. Some of the marshlands on the north and south sides of the channel outlet are also included in this sub-area (to a distance of around 200 feet). The area is much wider than the channel proper upstream, and consists of broad mudflats extending bayward.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicle
- Truck

Treatment Approach:

Treatment crews will use backpack sprayers to treat all non-native *Spartina* locations on either side of the channel mouth. Argo amphibious vehicles may be used to support this work, or may be used to treat plants where necessary. Spray trucks working from the levee will support both techniques.

Sub-Area 01b: AFCC Lower Channel

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.*

Site Description

The Lower Channel sub-area (01b) is a 152-acre area of the channel from the mouth upstream to Coyote Hills, with a maximum 300-foot wide, accreted sediment bench in the downstream reach. This area of the Creek channel contains the greatest extent of open mudflat within the channel, especially on the inside curve of a wide meander as the channel swings from a general northwest direction to a southwest outlet into the Bay.

Treatment Entity:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicle
- Truck

Treatment Approach:

Treatment crews will use backpack sprayers and/or Argo amphibious vehicles to treat all non-native *Spartina* plants along the shoreline of the Channel in this section. Backpacks will be used to augment Argo-based treatment work. Spray trucks working from the levee will support both techniques.

Sub-Area 01c: AFCC Upper Channel

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

The Upper Channel sub-area (01c) is a 93-acre area of the channel from the Coyote Hills upstream to Union City Blvd/Ardenwood Boulevard. This area consists of benches of sediment colonized by a mixed upper tidal suite of plant species, including broad swaths of pickleweed, gumplant (*Grindelia stricta*), alkali heath (*Frankenia salina*) and other marsh plants. The upper edges of this zone, nearest the levees, can contain upland weedy species like perennial pepperweed (*Lepidium latifolium*) and poison hemlock (*Conium maculatum*), especially adjacent to and upstream of the staging area. The main channel of the Creek within this portion of the site is much smaller than downstream, at about 20-30 feet across.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicle
- Truck

Treatment Approach:

Treatment crews will use backpack sprayers and/or Argo amphibious vehicles to treat all non-native *Spartina* plants along the shoreline of the Channel in this section. Backpacks will be used to augment Argo-based treatment work. Spray trucks working from the levee will support both techniques.

Sub-Area 01d: AFCC Upper Channel (Union City Blvd to I-880)

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and PestControl Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

The uppermost sub-area, also called the ACFCC Upper Channel (sub-area 01d), is the reach of the Channel that lies upstream of Ardenwood Blvd and runs to Alvarado Blvd, just short of I-880 in the east. This sub-area is comprised of 33-acre area of 40-50 benches of sediment lining a central channel area roughly 20 -30 feet across. Vegetation in this area has been dominated by non-native *Spartina* within the lower section, but towards Alvarado Blvd the vegetation grades into tule (*Schoenoplectus californicus*), alkali bulrush (*Bolboschoenus maritimus*) and cattail (*Typha* spp.) which are able to out-compete even hybrid *Spartina* within the brackish upper reaches of the Creek.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicle

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Truck

Treatment Approach:

Treatment crews will use backpack sprayers and/or Argo amphibious vehicles to treat all non-native *Spartina* plants along the shoreline of the Channel in this section. Backpacks will be used to augment Argo-based treatment work. Spray trucks working from the levee will support both techniques.

Sub-Area 01e: Strip Marsh North of Channel Mouth

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and PestControl Supervisor, (925) 803-7011, saul@acpwa.org.*

Site Description

The 18-acre western portion of Pond 3 was designated as the 'Strip Marsh North of the Channel Mouth, (Subarea 01e)' in the 2005-2007 ISP Site-Specific Plan (SSP) document for the site. It was originally delineated as a separate sub-area due to the more meadow-like aspect of the hybrid *Spartina* infestation there, and the fact that the vegetated edge of the marsh extends north of Pond 3 along a north/south levee in a tapering mid-marsh spur. As a result of treatments in the area, the meadow-like aspect of this area has been reduced, and the marsh edge is now almost exclusively open mudflat.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicle
- Truck

Treatment Approach:

Treatment crews will use backpack sprayers and/or Argo amphibious vehicles to treat all non-native *Spartina* plants along the shoreline in this section. Backpacks will be used to augment Argo-based treatment work. Spray trucks working from the levee will support both techniques.

Sub-Area 01f: Pond 3 – Ecology Marsh

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

Pond 3 or Ecology Marsh (Sub-area 1f) is the site of the first intentional planting (ca. 1976) of *Spartina alterniflora* in the San Francisco Bay Estuary as part of a US Army Corps of Engineers restoration and bank stabilization effort. This 137-acre former salt pond is comprised of a crescent shaped block of marsh running along the north contour of the AFCC. The marsh is bordered on the north, south and east by levees, and the western boundary of the marsh is open to the Bay. Much of the elevation of the marsh is relatively high, and dominated by a mixed pickleweed plain. A small channel drains the northern portion of the marsh, and runs roughly parallel to the levee on that, and a few smaller channels are located on the western end of the marsh near the Bay.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Treatment crews using backpack sprayers will walk the marsh plain in Pond 3, treating all non-native *Spartina* found there. This work will be supported by spraytrucks working from the adjacent levees.

Bair & Greco Island Complex

TSN: ISP-2004-2

Conservancy Grant Recipient:

U.S. Fish & Wildlife Service

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Responsible Entities:

U.S. Fish & Wildlife Service, Don Edwards National Wildlife Refuge, 1 Marshland Rd., Fremont, CA, 94605; Joy Albertson, (510) 792-0222 x 131, joy_albertson@fws.gov.

San Mateo County Mosquito Abatement District, 1351 Rollins Road, Burlingame, CA 94010; James Counts, Field Operations Director, (650) 344-8592. james@smcmad.org.

Site Complex Description:

The Bair & Greco Island complex encompassed by this plan is located in the southwest portion of the San Francisco Bay Estuary. The northern edge of the complex is at Belmont Slough on the border of Foster City and Redwood City, including the marshes of Brewer Island just south of the San Mateo Bridge. The southern border of the complex is the old Union Pacific railroad line just south of the Dumbarton Bridge. The site is a 3,060-acre complex including marsh islands, active and inactive commercial salt ponds, six large sloughs with numerous smaller channels, and other bayfront marsh that is part of the San Francisco Don Edwards National Wildlife Refuge (DENWR).

Site 2a – Belmont Slough, Bird Island and Redwood Shores

Site Description:

This 448-acre sub-area includes Belmont Slough, North Point, Bird Island, and the northern shoreline along Redwood Shores. The sloughs are open tidal waters lined with strips of varying widths composed of mixed pickleweed/*Spartina foliosa* marsh. The shorelines and islands are comprised of thin to moderate-width open mudflats grading into native *Spartina* marsh, with some pickleweed/gumplant (*Grindelia stricta*) marsh at higher elevations. All sloughs and marshes are bordered by levees topped by access roads or the Bay Trail. Residential areas border both Steinberger and Belmont Sloughs just inland of the levees, and include community walking trails.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x *foliosa*
Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers
- Truck

Treatment Approach:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

While most of the *Spartina* treatment along Belmont Slough over the past few seasons has been adequate, relying mainly on Argos, ISP will change its strategy for this site in 2011 to try and achieve full coverage with the least impact possible. Much of the work can be done more efficiently by airboat, especially the island by the mouth of the slough as well as some key areas of unconsolidated sediment that are too soft for the Argos. This will enable the treatment crew to use a combination of a truck staged on the levee roads and backpack sprayers to treat any remaining *Spartina* at the mid-marsh elevation and above, which could eliminate the need for Argos along this stretch. In upper Belmont Slough near the Oracle complex, the channel splits in two with the northern channel passing under Island Parkway where it becomes O'Neil Slough and feeds "Billboard Marsh" along Hwy 101 where the radio towers are located. The southern channel passes under Marine Parkway and meets Hwy 101 about 1000m upstream, remaining a narrow watercourse the entire way. Both of these areas can be walked with backpack sprayers.

An airboat will also be used to treat the perimeter of Bird Island, powerspraying hybrid *Spartina* within reach of the hose and deploying personnel with a backpack sprayer for any distant clones in the center of the island. The 1700m of mainland shoreline south of Bird Island between Belmont and Steinberger Sloughs will continue to be treated by Argo since it is the most efficient method and the harder substrate in this area is largely unvegetated (minimal impact).

Site 2b – Steinberger Slough, Corkscrew Slough, Redwood Cr. North

Site Description

This 894-acre sub-area includes the shoreline along Steinberger Slough, both banks of Corkscrew Slough, and the marshes and shoreline on the northern shore of Redwood Creek. This is part of the Bair Island Restoration and Enhancement Project managed by USFWS. The sloughs are open tidal waters lined with strips of pickleweed and native *Spartina* marsh. The shorelines and adjacent marshes are comprised of thin bands of open mudflats grading into native *Spartina* marsh, with some pickleweed/gumplant marsh at higher elevations. The Bay Trail runs along the left bank of Steinberger Slough, and in some places gets very close to the mean high water mark while other stretches have wider marshes stretching for over 250m. The other portions of the site are on Bair Island itself and are not accessible to the public.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Treatment Methods:

- Airboat

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

Argos will continue to be used to treat the left (western) bank of Steinberger from the open bay to approximately 3800m upstream. This is a large area that still contains a substantial proportion of hybrid mixed in with *S. foliosa*, and the only way to efficiently address the problem is with the amphibious tracked vehicles that have a high capacity for product transport.

An airboat will be used to treat all other areas of Site 2b. Much of this spray work can occur right from the deck of the boat because the infestations are along the slough banks, but some areas have deeper marsh fragments and the applicator will need to haul hose out to reach them. A few of the remnant marsh patches are substantial enough that personnel may need to be deployed with a backpack sprayer to complete the application. This method is expected to be employed at the southwestern end of Corkscrew Slough and along Redwood Creek at the northeastern tip of Bair.

Site 2c – B2 North

Site Description

The B2 North Quadrant is a 541-acre, formerly diked area on the northern section of Outer Bair Island, adjacent to Steinberger Slough. This area is also part of the Bair Island Restoration and Enhancement Project. The levees surrounding the area were naturally breached, and tidal marsh has been colonizing the area for some time. The site is predominantly pickleweed habitat, with native *Spartina* marsh in lower areas and along sloughs. The levees surrounding and scattered throughout the site area have deteriorated and there is no public access.

Approximately 200 acres of B2 North is located south of the PG&E powerlines and boardwalk. This section has a wide, manmade channel around its entire perimeter, but most of the sinuous channels into the heart of the marsh here are quite narrow. In contrast, the remaining 340 acres of the site north of the powerlines has retained a more substantial network of interior channels, including several that are wide enough to be used for treatment access. This area also has a wide, manmade channel around the perimeter, except along the southern border beneath the powerlines.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Airboat
- Backpack sprayers
- Helicopter broadcast (possible)

Treatment Approach:

This site will be treated by airboat over a series of days on a low or receding tide to maximize dry time and efficacy. Much of the site can be treated directly by the powersprayer, either from the deck or by hauling out up to 300 ft of hose. However the majority of the southern and northwestern portions of the site do not have channels wide enough to allow access by airboat. In these areas, personnel with backpack sprayers will be deployed from the airboat and will be guided to the infestation points and polygons by ISP personnel with GPS. When the applicators reach a channel that is too wide to ford they will be transported across by the airboat.

One 60-acre area on the northern end of B2 North still constituted a meadow of hybrid *Spartina* in 2010 due to incomplete treatment in 2008 & 2009 related to shortfalls from the State budget crisis. This was the only area on the West Bay to warrant broadcast helicopter treatment in 2010 because it had a sufficient density that was too great to treat from the airboat but was continuous enough that there was little waste of herbicide. Most likely the 2010 application will reduce the infestation below the threshold for helicopter broadcast, especially with the three-hour minimum for that contractor and the scattered nature of the surrounding infestations where broadcast would be wasteful and most likely less successful.

Site 2d – B2 South Quadrant - Rookery

Site Description

The B2 South Quadrant - Rookery, also part of the Bair Island Restoration and Enhancement Project, is a 62-acre diked area adjacent to B2 North Quadrant. This site is being returned to seasonal wetland habitat, and currently consists of a large pickleweed plain with little native marsh plant diversity. The levees surrounding the site are intact, but there is no public access.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Timing:

July 1 through the end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

This site does not have a sinuous network of channels; therefore, the airboat can only treat the edges of this site. The majority of the infestation will be accessed by personnel with backpack sprayers that have been deployed onto the marsh plain by the airboat at low tide. The site is divided into a north and south section and each has an access cut through a levee that will accommodate an airboat. The more heavily infested portion at the north end of this site was treated by helicopter broadcast in 2010 during more extensive work on B2 North. This site is not likely to need another helicopter application, especially with a wide, manmade channel around the northern portion of the site that will allow airboat access for retreatment.

Site 2e – West Point Slough NW

Site Description

West Point Slough NW is a 21-acre sub-area that includes both banks of the north end of West Point Slough up to Redwood Creek, the short channel off to the south referred to as First Slough, and a portion of the southern shoreline of Greco Island. The slough consists of open tidal waters lined with strips of native *Spartina* marsh. There are intact levees on the western edge of the slough, with a large office park complex and parking lot, as well as a light industrial site inboard of the levees. There is little public access to this area. Much of the developed shoreline on the northern portion of this sub-area is lined with rip-rap and fill. The recently constructed Westpoint Harbor marina is including in the boundaries of this site.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

While there are sections in the eastern half of this sub-area that are wide enough to allow Argo access, most of the western half is comprised of thin strips of rip-rap with little marsh vegetation other than patches of hybrid *Spartina* and no associated levee road. Therefore walking the site with backpack sprayers has been the treatment strategy. In 2011 and beyond, SMCMVCD will have access to an airboat that will be used to treat the scattered infestation along the base of the riprap more efficiently than by backpack. Some

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

backpack work may still be necessary. It is likely that the eastern end of this site will continue to be treated by Argo during work at the contiguous Site 2g. Some hybrid clones had already colonized the edges of the new Westpoint Harbor one year after its opening in 2008. SMCMVCD will be using the boat launch here for airboat access to Greco and Ravenswood and will continue to follow up on the pioneering infestation or any new patches.

Site 2f & 2h – Greco Island North & South

Site Description

Greco Island is reported to be the largest remaining prehistoric tidal marsh in the South Bay with a total area of 817 acres (Greco Island North sub-area covers 556 acres while Greco Island South is 261 acres). Greco is located immediately southeast of Bair Island and Redwood Creek and approximately one mile northwest of the western landfall of the Dumbarton Bridge at Ravenswood. The southern shoreline borders West Point Slough and the salt ponds of Redwood City as well as Bayfront Park in Menlo Park. The northern shore on the open bay is comprised of wide mudflats receiving flow from many small, shallow sloughs filled with native *Spartina* that spawls up onto the pickleweed marsh plain. The southeastern lobe of Greco contains more plant diversity, with many sinuous channels lined with *Grindelia*. There is a PG&E power line boardwalk running north-south across the length of the island, but there is no public access to the site.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack

Treatment Approach:

A new treatment strategy for Greco Island will be initiated in 2011 which will employ an airboat for low tide access to the entire island. The southeastern end of West Point Slough along Greco Island is heavily silted, which made access by standard boat very challenging at anything less than a 5 ft tide. There is also a network of channels and little islands on the south-central side of Greco that will be easy to access and efficiently treat with the airboat (while they were virtually impossible to include when working from a standard boat). The airboat will treat the outer edges of Greco and will work up some of the wider channels to reach interior areas. At this point the applicators will haul hose out from the craft to treat scattered patches, or will deploy personnel with backpack sprayers to hit areas beyond reach of the powersprayer hose. When the applicators reach a channel

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

that is too wide to ford they will be transported across by the airboat. Coupled with the increased mobility afforded by the airboat, the PG&E boardwalk can also be used to access the interior of the site and can be used as a staging area for moving product across the island. The staging capability can be helpful to reduce refilling trips and allow the airboat more time each day for actual treatment.

Site 2g – West Point Slough SW and East

Site Description

West Point Slough SW and East is an 87-acre sub-area that includes the southern end of West Point Slough around the end of Greco Island, and Flood Slough bordered to the east by Marsh Rd. in Bayfront Park. West Point Slough becomes narrower at the southeastern end, with a small wastewater treatment plant located at the confluence of West Point and Flood Sloughs. Bayfront Park is a large, heavily used public park located on hills and uplands overlooking the sloughs.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

With the length of shoreline contained in this site and the amount of hybrid *Spartina* remaining, Argos are still the preferred treatment method. They are able to transport the equivalent of eight backpacks along with the applicator and a monitor from ISP guiding the work with previously-surveyed GPS data. With the airboat working in the area at Greco Island South, it is likely that it will treat some clones along the banks of the major sloughs for convenience. Backpack sprayers may be utilized as the *Spartina* levels at this site drop to near eradication, eventually reducing the treatment impacts to the site.

Site 2i – Ravenswood Slough and Mouth

Site Description

The Ravenswood Slough and Mouth site is a roughly 136-acre sub-area including both shores of Ravenswood Slough to its mouth, and the open bay shoreline to Ravenswood Point, with expansive mudflats adjacent to the site. The slough is open tidal water lined with wide, accreted benches covered with native *Spartina* marsh. The slough is entirely

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

bordered by levees, with commercial salt ponds inland of the levees. There is no public access to this site.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle

Treatment Approach:

The majority of the length of Ravenswood Slough has been effectively treated each year by SMCMVCD using Argos, but a cluster of large clones out in the soft mud at the mouth have not always gotten the attention they deserve. Beginning in 2011, SMCMVCD will have an airboat at its disposal and can use this to efficiently treat the hybrid *Spartina* at the mouth of Ravenswood Slough. A combination of Argo and airboat will be employed to continue eradication efforts along both banks of the slough upstream to Hwy 84. The marsh segments along the slough are fairly soft, so SMCMVCD prefers to use Argos rather than to deploy applicators with backpacks either from the airboat or adjacent levee.

Site 2j – Ravenswood Open Space Preserve

Site Description

Ravenswood Open Space and Preserve contains both the official preserve marsh north of the west landfall of the Dumbarton Bridge (Hwy 84) as well as the shoreline and fringe marsh off Pond SF2 stretching south from the bridge to the northeast tip of the Cooley Landing site. The marsh is bordered by levees and is heavily used by the public for recreational purposes. SF2 was breached by USFWS in 2010 after several years of work constructing the proper geomorphology for the internal sloughs and building up numerous habitat islands that will poke up above the high tide water level.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Airboat
- Amphibious vehicle

Treatment Timing:

July 1 through the end of treatment season

Treatment Approach:

Argos will continue to be used along the edges of Site 2j to maintain efficiency over such a long stretch of shoreline. Beginning in 2011, SMCMVCD will employ an airboat to treat some hybrid *Spartina* clones that have colonized the soft mud at the interior of the pond. The airboat will also be helpful in combating a couple of hearty clones far out on the mudflat east of SF2. Previously they needed to run an Argo out to the plants with the winch attached and tow the vehicle back in once it got stuck. The rest of the shoreline along SF2 can be effectively treated by Argo.

Site 2k – Redwood Creek and Deepwater Slough

Site Description

This site includes the shoreline of Redwood Creek in Redwood City, bounded by the southeastern shoreline of Bair Island, with the Port of Redwood City and Greco Island to the east. Included within this area is the 400-acre Deepwater Slough Restoration area on the southeastern side of Bair Island, to the south of Corkscrew Slough. The Port of Redwood City facilities and the Redwood City Marina are located on the eastern shore, and there are a wide variety of habitats throughout this site, from rip-rap to restored tidal marsh, industrial facilities to houseboat communities.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

In 2010, Aquatic Environments Inc. (AEI) and ISP tried a novel treatment strategy for the Deepwater Slough site. The site is quite large and serves as the repository for a great deal of sediment taken out of Redwood Creek many years ago from the Port of Redwood City. These alterations have shaped the character of this marsh: the substrate below the marsh plain is much firmer than neighboring marshes, it is a higher elevation, and there is very

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

little channelization, with the U-shaped Deepwater Slough serving as virtually the only major channel. In addition, PG&E boardwalks prohibit the airboat from accessing various edges of the site from Corkscrew Slough because the propeller cage is too tall to clear the boardwalk. To combat these challenges adapted a new strategy to use some recent advances in technology AEI had acquired. The firm substrate and minimal interior channels seemed to lend itself well to the use of a large amphibious tracked vehicle called a MarshMaster. Because this vehicle floats, it could be ferried across Redwood Creek from the boat launch using the airboat to guide and stabilize its course. It is then driven up onto the marsh at near high tide along a section of gravelly substrate where it won't get stuck. Once up on the marsh plain the MarshMaster moves freely around the site with a 100 gal tank and 200 ft of hose that can be hauled around to scattered plants from a central position. This method was far superior to the only other available method, many backpack loads transported from an airboat-based shoreline refilling point. This method will be applied again in 2011 and beyond until the infestation is reduced to a point that it can be tackled safely and efficiently by just airboat and backpack.

There are a variety of other habitats and infestation types within this sprawling site that require a different treatment approach. Along the right bank of Redwood Creek from Hwy 101 to West Point Slough, the shoreline area has no trail or levee road associated with it and is very narrow, making backpacks the only feasible option. This includes the perimeter of the Seaport Marina that once contained a continuous ring of hybrid *Spartina*. The confluence of Smith Slough and Redwood Creek has only a few scattered points of hybrid *Spartina* that is probably best treated by airboat since it can work opposite the tidal cycle and act more efficiently than applicators with backpacks.

Site 21 – Inner Bair Island Restoration

Site Description

The Inner Bair Island Restoration marsh is a roughly 327-acre diked marsh area along the shoreline of Redwood City, between the northeastern terminus of Brittan and Whipple Avenues. The marsh is currently not open to tidal exchange, but the periphery of the main marsh area contains a thin band of tidal marsh vegetation, as does the adjacent channel that connects to Redwood Creek to the northeast. The site is slated to be opened to tidal exchange in the near future.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

Until this site is opened to tidal exchange, only the outer perimeter, a remnant marsh patch by San Carlos Airport, and the stretch along Hwy 101 need treatment. This will all be conducted by backpack sprayer guided by ISP personnel with the most recent inventory survey data on their GPS.

Site 2m – Pond B3 – Middle Bair Island Restoration

Site Description

Pond B3: Middle Bair Island Restoration is a roughly 420-acre previously-diked salt pond in the west-central portion of Bair Island. It is bordered to the south by Corkscrew Slough, to the west by Steinberger Slough, and on the northeast by Pond B2 North that is already composed of vegetated marsh. The site was breached late in 2008, returning tidal exchange to an area comprised of long-dead salt marsh vegetation and channels with stagnant water. The breach is within existing stands of hybrid *Spartina* along Steinberger Slough, which served to quickly invade the site and allow clones to establish. Due to funding cuts during the height of the State budget crisis, this site was not treated in 2009. It was first treated in 2010, at which time there were about 10 moderate-sized clones 2 m or more in diameter, and three times that many scattered plants.

Treatment Entity:

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Airboat

Treatment Approach:

Airboat is the only effective tool to treat this site. It is largely unvegetated mudflat at various elevations (some of which are already appropriate for rapid marsh vegetation colonization) and there is no ground access. The substrate is fairly firm, so the airboat can move around readily and an applicator can even deploy onto the substrate if they need to haul hose out to scattered points from a central location.

Blackie's Pasture

TSN: ISP-2004-3

Conservancy Grant Recipient:

California Wildlife Foundation

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Responsible Entities:

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeFoundation.org.

City of Tiburon Public Works, 1175 Tiburon Boulevard, Tiburon, CA 94920; Joel Brewer, Superintendent of Public Works, (415) 435-7399, jbrewer@ci.tiburon.ca.us.

Tiburon Audubon Center and Sanctuary, 376 Greenwood Beach Rd., Tiburon, CA 94920; Brooke Langston, Center Director, (415) 388-2524 Ext. 109 BLANGSTON@audubon.org.

Site Complex Description

Blackie's Pasture is a small City of Tiburon park co-managed by the City of Tiburon and Tiburon Audubon, located along the shoreline of Richardson Bay adjacent to Tiburon Boulevard. The park is comprised of a one-acre pasture, a small creek channel ("Blackie's Creek") along the eastern edge of the pasture, a shoreline area that includes the channel mouth, open mudflats, landscaped pathways and picnic areas, and rip-rap fill to the east along the Tiburon Peninsula.

Site 3a – Blackie's Creek

Site Description

Blackie's Creek channel flows under Tiburon Boulevard, cuts through the edge of the pasture, under a paved recreational and maintenance pathway bridge, and then flows roughly north-south for the final several hundred feet to the Bay. The channel is 10-15 feet wide, with steep-sided banks above narrow benches of pickleweed, and it cuts its way through an area of the park composed of fill material. The banks above the mean high tide line are populated by several species of non-native upland weeds, with stands of coyote-bush (*Baccharis pilularis*).

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa (possible)

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

While the infestation of hybrid *S. alterniflora* has been significantly reduced from the channel-clogging situation at the start of treatment, there are still some lingering plants over the length of the channel. These plants will be treated by backpack sprayer.

Site 3b – Blackie’s Creek Mouth

Site Description

The second major area of the Blackie’s Creek Site is the Creek Mouth. This sub-area includes the small delta formed at the mouth of Blackie’s Creek as it enters Richardson Bay, as well as the shoreline east along the Tiburon Peninsula. This area is dominated by *Spartina* stands, with a thin band of high marsh pickleweed habitat abutting the edges of the filled portions of the park. On the southern end of this area is a small beach that is mostly inundated at high tide, and on the northern end, the marsh is bordered by rip-rap and fill.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa (possible)

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

As with the upstream portion of the site, all seedlings or young *S. densiflora* found at the mouth of Blackie’s Creek will continue to be removed manually. The site will be

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot little *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

The infestation of hybrid *S. alterniflora* at the mouth of this site has been a challenge to comprehensively treat because of a variety of cryptic hybrid morphologies that have taken several seasons to decipher. There are also a variety of substrate types at this small site, and it was thought that some of the very firm substrate was to blame for varying morphologies amongst what was believed to be native *S. foliosa*. In 2010, the high spring rainfall resulted in much more robust plants, and this brought certain hybrid traits to the fore and helped with definitive identification. Any remaining hybrid *S. alterniflora* plants will be treated by backpack sprayer.

Corte Madera Creek Complex TSN: ISP-2004-4

Conservancy Grant Recipient:

Friends of Corte Madera Creek Watershed (Friends)

Site Responsible Entities:

Friends of Corte Madera Creek Watershed P.O. Box 415 Larkspur CA 94977; *Sandy Guldman, President*, (415) 456-5052, sandra.guldman@gmail.com.

California Department of Fish and Game, Central Coast Region, PO Box 47 Yountville, CA 94599; *John Krause, Associate Wildlife Biologist*, (415) 454-8050, jkrause@dfg.ca.gov

Site Complex Description

The Corte Madera Creek watershed is located in Marin County and flows into northwestern San Francisco Bay along the southern side of the San Quentin peninsula. The site complex begins at the upper extent of tidal influence, approximately 5.2 kilometers from the mouth, where the 60 meter-wide channel flows from the large concrete culvert at the College of Marin in the City of Kentfield, through the City of Larkspur and along the northern border of the Town of Corte Madera to the Larkspur Ferry Terminal at the mouth. The surrounding landscape is highly developed along the length of this channel, including residential single-family houses, higher density condominiums and apartments, a small amount of commercial development, and several areas of houses along boardwalks perched on stilts above mudflat or marsh. At 900 meters upstream of the mouth, Corte Madera Creek flows under Hwy. 101 and continues out to the bay. There are 12 sub-areas in this site complex.

Site 4a – Corte Madera Ecological Reserve (CMER)

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The Corte Madera Ecological Reserve (CMER) is located on the right bank at the mouth of Corte Madera Creek and is part of a large marsh complex stretching 1.2 miles to the south that includes Muzzi and Martas Marshes down to San Clemente Creek. The majority of the northern border of CMER is occupied by the 650-meter-long residential Greenbrae Boardwalk community along the creek bank, while the southern border of the site is a straight, manmade channel that separates the site from Muzzi. The marsh is owned and managed by California Department of Fish & Game, while the residential parcels have numerous private landowners.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

Since ISP and Friends of Corte Madera Creek began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

There is a small amount of hybrid *S. alterniflora* remaining at this site, most of which is associated with either the small channels at the interior or exist as scattered patches amongst large healthy stands of *S. foliosa*. In both cases, these patches often escaped detection until they reached a sufficient age and size to be readily identified. Any hybrid *S. alterniflora* found on the site will be treated by backpack sprayer. There has been a relatively small amount of hybrid *S. densiflora* at this site in the past, but it may have been eradicated by the 2010 treatment efforts. If any significant area of hybrid *S. densiflora* is found it will be treated by backpack sprayer during the hybrid *S. alterniflora* application. Otherwise a small patch will simply be removed manually. In addition, if

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

hybrid cordgrass is found on any of the private parcels along Greenbrae Boardwalk, the landowner has the option to choose herbicide or manual removal.

Site 4b – College of Marin Ecology Study Area

Site Description

The College of Marin Ecology Study Area is located between the main stem of Upper Corte Madera Creek (just below the Stilling Basin) and McAllister Slough to the north, which was the main channel of the creek before the flood control project was constructed by USACE. There is also a second portion of this sub-area, the Behrens Drainage, a vegetated flood control channel wedged between McAllister Slough and a residential community on Behrens Drive. McAllister Slough enters the main channel through a culvert about 250 meters upstream of the culverts serving Creekside Park. This site has a number of landowners including College of Marin, State Lands Commission, Marin County, and private residential parcels.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Manual removal
- Backpack sprayers

Treatment Approach:

All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

One patch of possible hybrid *S. alterniflora* was mapped (low confidence) at this site in 2010 but was not treated yet. If this is confirmed as invasive cordgrass it will be treated by backpack sprayer.

Site 4c & 4d – Piper Park East and West

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Piper Park is a multi-use area owned and managed by the City of Larkspur. The site contains two marshes (east and west) bordering the playgrounds, picnic tables and parking area. Piper Park East contains the banks of Larkspur Creek and meets Piper Park West at the point where they reach the main channel of Corte Madera Creek. The City of Larkspur does not allow herbicide use so all work at this site has been manual from the outset of ISP work in 2003.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

Since ISP and Friends began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. Until recently, there were still several properties along neighboring Riviera Circle that had uncontrolled hedges of *S. densiflora* that were reinfesting Piper Park. Working with the Marin Agricultural Commissioner, Friends and ISP were finally successful at getting most of those properties controlled for the first time in autumn 2010. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately. This site is in a no-herbicide zone (City of Larkspur), so any pioneering plants of hybrid *S. alterniflora* or hybrid *S. densiflora* will also be removed manually.

Site 4e – Larkspur Ferry Landing Area

Site Description

The area around the Larkspur Ferry Landing contains three distinct locations with non-native cordgrass infestations. The area referred to as the “bathtub” is the open rectangle of rip-rap and thin fringe marsh adjacent to where the ferries dock. The second area is the drainage channel west of the terminal’s parking lot that flows from Sir Francis Drake Blvd. south to the main channel of Corte Madera Creek. Finally, the third area includes a

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

thin fringe marsh edge below the rip-rap that extends east of the bathtub, behind an old seawall, and out towards San Quentin. The first two areas are owned by the Golden Gate Bridge, Highway and Transportation District (GGBHTD), while the third is part of the City of Larkspur.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately. Most of the hybrid *S. alterniflora* appears to be eradicated from this site after several years of treatment. Any remaining stands will be treated by backpack sprayer, especially if the roots are down under the riprap, but individual stems or small plants will be removed manually to complete the eradication.

Site 4f – Riviera Circle

Site Description

Riviera Circle (now known as Larkspur Marina) is a housing development constructed on rip-rap and fill north of Doherty Drive along the south side of Corte Madera Creek in the City of Larkspur, west of Hwy 101 and a row of houses along Lucky Drive. This entire site is comprised of the shoreline frontages of privately-owned residential parcels, except for a narrow easement held by the City of Larkspur. This community is bordered by water on three sides: the north side sits on the mainstem of Corte Madera Creek while the west side sits on the channelized lower reaches of Larkspur Creek. The east side is along a Town of Corte Madera flood management channel connected to the High Canal. The banks of this area are generally steeply graded to raise the homes above the historic marsh elevation on which they were built. A thin perimeter band of mixed marsh vegetation consisting of pickleweed, alkali heath (*Frankenia salina*) and gumplant

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

(*Grindelia stricta*) is bordered directly by the yards, docks, and gardens of these residential properties. There is an irregularly-shaped salt water lagoon in the center of the development, connected to Larkspur Creek and the main channel by culverts.

Until autumn 2010, successful cordgrass eradication at this site was hampered by some recalcitrant homeowners that would not allow their invasive *S. densiflora* to be removed despite multiple pleas to that effect, as well as Friends' offers to use whichever method the landowner would choose to accomplish the work (i.e. remove it manually or treat it with herbicide). These homeowners represent just 13% of the 75 parcels around Riviera Circle, yet their inaction threatened the work accomplished by all of their neighbors around the community, as well as the work Friends/ISP have done throughout the watershed. With the State listing of all non-native *Spartina* species as noxious weeds in April 2010, County Agricultural Commissioners now had the power to require control of non-native *Spartina* on private property. With the help of the Marin Agricultural Commissioner, most of the holdouts finally agreed to allow access for Friends to remove their invasive cordgrass, and by the end of December 2010, the Conservation Corps North Bay (CCNB) was able to complete the work at all parcels with permission granted.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x *foliosa*
Spartina densiflora
Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec
Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Manual removal
- Backpack sprayers

Treatment Approach:

CCNB will begin by digging the untreated *S. densiflora* infestations at 262 & 328 Riviera Circle. A separate, smaller contractor will remove an untreated area of *S. densiflora* at 370 Riviera Circle, and will work with ISP biologists to dig sprouts and seedlings at all other parcels at this site. Any hybrid *Spartina* will be treated by backpack sprayer.

Site 4g – Creekside Park

Site Description

Creekside Park contains 21 acres of restored marshland habitat in Kentfield north of Corte Madera Creek west of Bon Air Road and Marin General Hospital near the upstream extent of tidal influence in this watershed. The site received dredge spoils from the creek in the late 1960's when the US Army Corps of Engineers constructed Units 1 and 2 of the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Corte Madera Creek Flood Control Project. In 1976 a new channel system was excavated, upland areas were graded to intertidal elevations, central islands were constructed to provide upland refugia, and the site was planted with cordgrass and pickleweed. Creekside Park is a multi-use property, with playground and upland park areas to the east of the main marsh, and a paved portion of the Bay Trail along the southern border adjacent to the mainstem of the creek. A narrow lobe of marsh runs southeast from the central site, sandwiched between the creek and Bon Air Road down to the bridge. In the northwest corner of the site, there is a drainage channel that runs along McAllister Ave. in front of Bacich School that is hydrologically connected to the straightened channel along the western border of the marsh.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina anglica

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora and *S. anglica*: May/June with follow up manual work after Sept. 1

Hybrid *S. alterniflora* & *S. densiflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

As the original introduction site for *Spartina densiflora* in the San Francisco Bay estuary, the infestation at Creekside Park was substantial and well-established when control work began in 2006. Few mature *S. densiflora* plants remain, but in some of the areas where the infestation had reached the level of a continuous meadow, there are still substantial amounts of living root mass below ground that continue to push up new green growth. ISP and Friends began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, which at Creekside included subsurface mowing of the perisitent above-ground biomass (dead, partially dead, or living) in areas that had received at least two herbicide applications. This allows the true status of each plant to be evaluated so that the best treatment method can be utilized. Many plants did not return after the mowing, while other areas of the site had a big flush of new green growth. The strategy for *S. densiflora* eradication at Creekside Park is to continue to apply multiple treatment methods over the course of each year, eventually starving even the most persistent of the plants. Herbicide will be applied once a year during active growth or flowering but before seed set, approximately early June. Although small *S. densiflora* with limited leaf surface area tend to be less impacted by

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

herbicide, we still expect a certain level of mortality, and the application has the added benefit of stopping seed set for the entire season. Following the herbicide treatment, a crew will return to the site in early September with brushcutters to mow any meadow areas that are too big to dig. All outliers or individual plants will be manually removed and disposed off site. This digging effort extends over a number of days and can be conducted from September through December.

Any remaining patches of the other three *Spartina* “species” (*S. anglica*, hybrid *S. alterniflora*, hybrid *S. densiflora*) will be inventoried in late May/early June and treated with herbicide soon thereafter. It is essential to treat the *S. anglica* this early since it sets seed by July along with the *S. densiflora*. Late treatment and misidentification are the two primary reasons that this species has not already been eradicated from the Bay.

Site 4i – Upper Corte Madera Creek

Site Description

This sub-area has three main sections: the fringe marsh below the berms of Corte Madera Creek upstream of the Bon Air Bridge to the Corte Madera Creek Flood Control Project Stilling Basin, the marsh around Lot 13 (College of Marin) including the channel leading down to the main channel, and a tidal channel south of the COM playing fields. Most of these areas are owned by COM, but include parcels owned by both Marin County Water Conservation and Flood Control District as well as State Lands Commission. The banks of the creek are armored in many places to contain high tides and storm flows, but numerous stretches contain a narrow strip of marsh vegetation below the rip-rap, mostly pickleweed and *S. foliosa*, and a mudflat component. Much of the upper reach has an open space character, with Creekside Park (Site 4g) and the College of Marin Ecology Study Area (Site 4b) along the north bank, a small marsh to the south downstream of the confluence with the Lot 13 drainage, and the backyards of the houses on the south bank set back from the creek on the other side of the Marin County Flood Control District’s gravel maintenance road above the rip-rap. The upper reach also includes the 300-meter channel of the Lot 13 drainage, the extent of its tidally influenced waters. A second shorter channel joins the first at the footbridge behind Lot 13 at the College of Marin, and there are associated marsh areas here as well as at the confluence with Corte Madera Creek.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: June 1 through the end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

Since ISP and Friends began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately. All other *Spartina* “species” will be treated by backpack sprayer .

Site 4i – Lower Corte Madera Creek

Site Description

The Lower Corte Madera Creek sub-area runs from the Bon Air Bridge downstream to Hwy. 101 and contains the highest level of development contiguous to the creek, consisting mainly of single-family houses and condominiums, many with docks to provide recreational access to the water. There are also several small office parks along the shoreline for medical doctors and other professionals. Under the Hwy. 101 bridge and interchange ramps there is a small mid-elevation marsh section on the north bank and some mudflats on the south. According to the Friends of Corte Madera Creek 2008 report, this sub-area contains six sections:

- 9 private properties on the right bank between Bon Air Road and the channel separating Larkspur Plaza Drive from Larkspur Boardwalk One (Sub-area 4k). These are 18 Bon Air Road, Edgewater Place, Larkspur Creekside open space, and all Larkspur Plaza Drive condominiums and apartments);
- Town of Corte Madera property on the right bank in the Low Canal, below the flood control gates, and in the High Canal that leads into Corte Madera. The Low Canal is downstream of and adjacent to Riviera Circle (Sub-Area 4f);
- 16 individual homes and 2 condominium complexes on Lucky Drive, downstream of the Low Canal on the right bank;
- 27 private properties and two City of Larkspur parks (Hamilton Park and Bon Air Landing) on the left bank along South Eliseo, downstream of Bon Air Road;
- Bon Air Creek, a City of Larkspur drainage channel that leads from the parking lot behind the Bon Air Shopping Center through a culvert into the main channel of Corte Madera Creek at the downstream end of South Eliseo Drive; and
- City of Larkspur property along the multi-use path that reaches from the downstream end of South Eliseo Drive to Highway 101.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

As with most of the remaining *S. densiflora* sites around Marin, ISP treatment work over the past few years has eliminated all the mature plants, leaving just sprouts and seedlings to contend with. The Lower Corte Madera Creek site has a single holdout landowner that still has mature plants, but they have been handed over to the Marin Agricultural Commissioner and control should begin in early 2011. All *S. densiflora* within Site 4i will be manually removed and disposed off site.

There are several sizable infestations of hybrid *S. alterniflora* recently discovered in residential yards along Lucky Drive, as well as one parcel that had a full yard of hybrid *S. densiflora* that was first treated in 2009. These sites will continue to be treated by backpack sprayer until eradicated. Small pioneering hybrids along the rest of the site's shoreline will either be removed manually or treated by backpack sprayer depending on factors such as the workability of the substrate, size of the clone, and the municipality in which it is growing.

Site 4j – Corte Madera Creek Mouth

Site Description

The Corte Madera Creek Mouth sub-area runs from Hwy. 101 downstream to the mouth, bordered by CMER (Sub-area 4a) to the south and the Larkspur Ferry Terminal (Sub-area 4e) to the north, and according to the Friends of Corte Madera Creek 2008 report, includes four sections:

- south of the main channel, one commercial property adjacent to Highway 101 and 57 properties along Greenbrae Boardwalk;
- north of the main channel, Wood Island, a private commercial property; three parcels owned by the Marin County Water Conservation and Flood Control District (FCD); and a tidal marsh south of the Larkspur Ferry Terminal owned by the State of California;

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- north of the main channel, City of Larkspur property along the multi-use path that continues from Sub-area 4i (Lower Corte Madera Creek) under Highway 101, and onto Sub-area 4e (Larkspur Ferry Landing); and
- both north and south of the channel, Caltrans right-of-way under Highway 101; and the railroad right-of-way owned by the County of Marin.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora* & *S. densiflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

There is a single area on the right bank beneath Hwy 101 that contained a small meadow of *S. densiflora*; this area has had a similar treatment strategy applied to it as the meadows at Creekside, namely herbicide application followed by sub-surface mowing with a brushcutter. If CCNB cannot get to this site before flowering, it will be treated with herbicide to stop seed dispersal. Otherwise any living *Spartina* plants remaining in this area will be manually removed.

Throughout the rest of the site, including the island behind the ferry terminal, there are no meadow areas of *S. densiflora* remaining and it will all be removed manually. The tidal marsh south of Larkspur Ferry Terminal was an area overrun by cryptic hybrid *S. alterniflora* that was finally distinguishable in 2010 (after the high spring rainfall) and required the treatment of a significant proportion of the cordgrass growing at this site. Inevitably a follow-up application will be needed at this site in 2011 and probably also 2012. It may be necessary to also apply herbicide to the *S. densiflora* in this marsh to stop seed production and dispersal until the crews can come in for manual removal in September. Any other scattered stands of hybrid *S. alterniflora* or hybrid *S. densiflora* will be treated by backpack sprayer.

Site 4k – Boardwalk No. 1

Site Description

Boardwalk Number One (also known as Arkites) is a community of homes on stilts (some former houseboats) directly over the mudflat and pickleweed marsh of the south

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

banks of Corte Madera Creek in the City of Larkspur bordered to the east by Piper Park West (Site 4d). The homes and connecting boardwalk line the east bank of a narrow channel stretching 400 meters north from Doherty Drive to the mainstem, and continue another 300 meters along the south bank of Corte Madera Creek.

Sub-Area 4k comprises 34 parcels along the boardwalk and includes all appropriate cordgrass habitat between and even under the structures as well as the banks of the creek and the marsh on the interior side. Because the boardwalk is constructed over the edge of the marsh encompassed by Piper Park West which is an active clapper rail breeding site, we were not able to enter the Arkites before September 1 until the most recent amendment to the BO was issued in 2008, with the understanding that we need to get to the *S. densiflora* plants before seed set if the eradication efforts are to be successful.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

S. densiflora and its hybrid: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

All sprouts of seedlings of *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately. Hybrid *S. densiflora* has also been found on this site; all detections were relatively small and were removed manually. This will continue to be the strategy for this *Spartina* “species” since new detections should be just small pioneers.

Site 4l – Murphy Creek

Site Description

Murphy Creek is a small tributary of Corte Madera Creek in the City of Kentfield west of the College of Marin and upstream of the rest of the sub-areas of this site-specific plan. This plan refers to the 150-meter section of Murphy Creek that flows behind a small apartment building on Kent Avenue, west of the intersection with Stadium Way. The creek in this area contains mostly freshwater vegetation, and has a high percentage of canopy closure from the trees preserved on both banks. The surrounding landscape is fully developed, with homes, apartments, and the large Lot 15 (College of Marin parking)

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

that increases the impervious surface and resultant runoff to the creek. This streambed is very silty and there is vegetation encroaching from the banks towards the center of the channel.

Treatment Entity:

Friends of Corte Madera Creek Watershed

Spartina Species Present:

Spartina densiflora has not been found on the site in 2009 or 2010

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

The site will be monitored for the presence of invasive *Spartina*; if any is found it will be removed manually. If none is found in 2011, that will be three consecutive years with zero detections and the site will be added to ISP's list of eradicated sites.

Coyote Creek & Mowry Slough Complex

TSN: ISP-2004-5

Conservancy Grant Recipient:

US Fish & Wildlife Service (Sites 5a-5f) and California Wildlife Foundation (Sites 5g-h)

Site Responsible Entities:

US Fish and Wildlife Service, Don Edwards National Wildlife Refuge, 1 Marshland Rd., Fremont, CA, 94605; Joy Albertson, (510) 792-0222 x 131, joy_albertson@fws.gov.

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, Administrator, 510.208.4438, alarson@californiawildlifeoundation.org.

Wildlands Inc., 3855 Atherton Rd., Rocklin, CA, 95765; Cindy Tambini, Director of Planning, 916.435.3555, ctambini@wildlandsinc.com

Site Complex Description

The Coyote Creek and Mowry Slough site complex includes approximately 3,700 acres of marshland in the southeast corner of the bay within the Don Edwards San Francisco Bay National Wildlife Refuge extending from the Dumbarton Bridge south to Coyote Creek adjacent to the cities of Newark and Fremont. The site is surrounded entirely by marsh and salt ponds, and there is no public access to the outer marshes. A portion of the Bay Trail runs along the upstream reach of Newark Slough (Sub-area 05c) and a trail

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

provides recreational access through the western portion of LaRiviere Marsh (Sub-area 05d). This plan delineates eight sub-areas targeted for non-native *Spartina* control including recently restored tidal marshes, freshwater ponds and upland islands, as well as highly diverse historic marsh habitats that include large mid-marsh plains, extensive dendritic channel complexes, high marsh, pans, vast mudflats, thin strips of fringe marsh, larger creek and slough channels, and sandy beach areas.

Site 5a – Mowry & Calaveras Marshes

Site Description

The Mowry & Calaveras Marshes site includes 1,080 acres of diverse marshland habitats along the bay shoreline and along the banks of creeks and sloughs. The area begins on the eastern banks of the mouth of Newark Slough, at its confluence with Plummer Creek, and extends two miles southeast along the 500 meter-wide Mowry Marsh to Green Point and the mouth of Mowry Slough. The site continues upstream approximately four miles as the 150 meter-wide marshes on both banks of Mowry Slough narrow to thin strips below the earthen levees, and also continues south along the thin fringe marsh bayward of salt ponds M1 & M2 that dominate most of this peninsula. At the extensive marsh and mudflats of Calaveras Point, the site continues east upstream along the northern shoreline of Coyote Creek for approximately 4400 meters to the first major slough. The marshes in this area range from thin strips of *Spartina foliosa* and pickleweed (*Sarcocornia pacifica*) marshes between mudflats and salt pond levees, to wide, high-marsh pickleweed habitat along the banks of the larger sloughs, to areas with brackish vegetation as a result of the influence of Coyote Creek and the wastewater discharges from San Jose.

Treatment Entity:

US Fish & Wildlife Service

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers

Treatment Approach:

The marsh area encompassed by this ISP sub-area is vast, and the remaining level of infestation varies from sparse to still-heavily infested. While the invasive *Spartina* in Mowry Marsh & along the right bank of Mowry Slough have been well controlled, substantial areas of cryptic hybrid plants in Calaveras Marsh and along the left bank of Mowry Slough went undetected until 2009 by which time they had expanded significantly and were obvious now that clones had matured. These two areas also

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

received only a helicopter broadcast application in 2009 due to budget shortfalls, but were comprehensively treated in 2010 on the ground.

Most of the treatment areas within this site are not accessible from land so the crews need to enter from the Bay side at an appropriate tide to allow adequate dry time for the herbicide. This necessitates the use of an airboat to approach the marsh edge on a low or receding tide when there is not enough water for a standard outboard motor to operate. Along Mowry Marsh, Mowry Slough, and from the mouth of the slough down to Calaveras Point the airboat will deploy personnel with up to 300 ft of hose to treat any hybrid *Spartina* within reach. When heavier infestations are present, the applicators keep the hose reeled out to an appropriate length and the airboat moves along parallel to the shoreline to improve efficiency and limit the impacts of walking back and forth through the marsh. For deeper forays into the marsh, backpack sprayers will be filled at the airboat and applicators will be escorted into the marsh by ISP personnel to navigate around to the previously-mapped plants. Any newly discovered *Spartina* will also be mapped and treated at this time.

In addition to the use of airboat and backpack sprayers, treatment of Calaveras Marsh will employ an additional piece of equipment, an amphibious tracked vehicle called a MarshMaster that has very low ground pressure. This marsh is so wide from shoreline to levee and so vast overall that relying solely on backpack sprayers to treat outside of the airboat hose zone is not feasible or practical. A significant portion of the infestation at Calaveras is in a mid-marsh band that begins just beyond the 300 ft reach of the airboat hose and stretches towards the levee for another 200-300 ft. In addition, the widely scattered infestation beyond that zone would require miles of marsh walking to treat as well as inefficient refilling trips back to a staging point. The MarshMaster can carry a 100 gal tank of herbicide and enough personnel to branch off from the vehicle and haul hose around from a central point to limit the impacts to the marsh. Backpack sprayers can also be deployed from the MarshMaster to increase efficiency by walking out to widely scattered points while larger clones are treated with the powersprayer. When the MarshMaster is empty it can travel straight down to the shoreline to be refilled by the airboat rather than making repeated trips over the marsh to a staging area on the levee which could create a greater impact to the marsh surface.

Site 5b – Dumbarton and Audubon Marshes

Site Description

This site is located south of the Dumbarton Bridge and west of the City of Newark in the Don Edwards San Francisco Bay National Wildlife Refuge, and includes the areas known as Hetch-Hetchy Marsh, Railroad Marsh, Barge Canal and Plummer Creek. The larger Dumbarton and Audubon Marshes are bordered to the northeast by the lower reaches and mouth of Newark Slough. The 860 acres of marshland in this complex include open marsh plains, eroding marsh scarps, open mudflats, dendritic channels, and other habitats. An abandoned rail line bisects the larger portion of this sub-area, as does the Hetch-Hetchy Aqueduct that delivers water to San Francisco and the peninsula from the reservoir north of Yosemite Valley that is fed by the mighty Tuolumne River watershed.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

US Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: August 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle
- Backpack sprayers
- Truck

Treatment Approach:

This site is another very large area of marshes and long channels with a great diversity of habitat types, and most of the areas are only accessible from the water/mudflat side. The reductions in the *Spartina* infestation achieved by spray ball aerial spot treatment for two years followed by one year of broadcast aerial application on the densely infested channels of Dumbarton Marsh, allowed ISP to begin an aggressive strategy in 2009 centered around the use of an airboat to access the infestation at low tide from the mudflats and channel banks. In 2010, ISP saw the great efficacy achieved after the first year of these efforts and applied the same strategy for a second year. The infestation is first mapped by ISP from low-flying helicopter, and then the treatment crew goes to each point, line and polygon on the ground to ensure the entire infestation is thoroughly treated.

Dumbarton Marsh will continue to be treated by airboat with support from backpack sprayers. The airboat can move along the mudflat at a low or receding tide, spraying shoreline clones right from the deck or parking at the marsh edge and hauling up to 300 ft of hose out onto the marsh plain. However the marsh is up to 800 m deep in some areas, so backpack sprayers are necessary to pick up the plants beyond reach of the airboat hose. Fortunately, the backpackers can be deployed onto the PG&E boardwalk to traverse the marsh and work back towards the middle. They can also take the boardwalk to the old railroad grade and walk west along this berm to get deeper into the marsh; this limits the impacts to both the marsh and the applicators.

Audubon Marsh is bordered on the south and east by this same railroad grade, and is bisected by the Hetch Hetchy Aqueduct. It also has two earthen levee roads on its northwest flank that a vehicle (either truck or Argo/MarshMaster) can use to drive right up to the historic areas of *Spartina* infestation for treatment. Treating the center of Audubon, however, is more challenging and requires a combination of herbicide delivery systems. Backpackers can be deployed on the right bank of Newark Slough, and ISP

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

personnel with GPS will guide them to the scattered plants and narrow channel infestations. They move south across the marsh plain or walk along the base of the railroad grade when avoiding larger channel crossings. The airboat will support them with refills while it is used to treat the remaining infestation on the banks of the single large channel in this marsh. The PG&E boardwalk also crosses this marsh and marks the upstream stopping point for the airboat along that channel because the propeller cage is too tall to fit under it. Beyond that point the portion of Audubon that is wedged between the pipeline and railroad begins to taper, as the backpackers make their way south towards the open bay. To approach from the opposite direction, the southwestern tip of Audubon between the railroad and the pipelines can be accessed on the ground directly by backpack applicators from the pumphouse area. Finally, the two massive pipes have had *Spartina* infestations under and around them that create an additional challenge to fully treat. The applicators need to use the regularly-spaced wooden ladders to go up and over each of the pipes, and then walk long distances along the length of them to pick up all the infestation points. This has to be done on both sides as well as between the pipes.

Another separate section of this large and diverse site is the area located off the left bank of Newark Slough, a portion of Audubon Marsh. Many of the same challenges are present here as across the slough; there are no easy land access points for most of the area, and the presence of the pipelines adds some complications and increases the time commitment to complete the work. The widest portion of these marshes is located between the pipelines and the railroad. It contains one major channel that is sinuous where it meets Newark Slough, but upstream it is a straight watercourse that runs parallel to the railroad. The airboat will travel up this slough, treating invasive *Spartina* along the banks and deploying backpack personnel to walk out on the marsh plain up to the southern side of the pipelines. A levee road on the north side of the pipes can be used for an Argo to treat the infestation found in this thin slice of marsh, and to support backpacks to walk out beyond the reach of the 200 ft hose. There is also a road on the south side of the pipes that only runs for a short distance but may be utilized depending on the results of ISP's inventory in 2011.

Across the railroad grade from this area of Audubon is a straight, 2200 m-long channel called Barge Canal that has a thin strip of marsh on its north side called Railroad Marsh. The banks of this channel were very heavily infested with hybrid *Spartina* before the airboat treatment began in 2009. It will continue to be treated by airboat, normally on a moderate tide since the trapezoidal sides of the channel are too steep to allow the airboat to remain stationary for long to complete the application. Railroad Marsh contains a series of five smaller channels that cut through an upland berm that bisects the length of the site. Backpackers are deployed with ISP personnel to walk to the remaining infestation points along these channels to continue the eradication efforts.

Finally, Plummer Creek is the last major area of Site 5b. It is similar to Barge Canal in that the steep sides of the channel require that it be treated on a moderate tide to limit the amount of time the airboat needs to remain at full throttle to stay in place. Although this channel is about 1000 m longer than Barge Canal, the infestation was more scattered and didn't contain long stretches dominated by hybrid *Spartina*. However in 2010, the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

treatment crew found lots of patches of previously-cryptic hybrid that had finally popped up at the upper edge of the long *S. foliosa* stands that line its banks. The site will continue to be treated by airboat, with backpacks only needed for one deeper marsh polygon on the right bank about 1300 m from the mouth, and to treat the upper 320-m reach of Plummer that has an obstruction that prohibits the use of the airboat. The Plummer Creek Mitigation Marsh at the upper end of the channel is not owned by USFWS and will be discussed under Site 5h, which is new to this site complex after hybrid was first detected there late in 2009 and treated in 2010 for the first time.

Site 5c – Newark Slough

Site Description

The Newark Slough site encompasses roughly 400 acres of marsh and creek channel bank stretching from Thornton Avenue and Hickory Street in the City of Newark, downstream to the edge of the abandoned railroad line, 900 meters upstream of the confluence with Plummer Creek. In its upstream reach, the wide, levee-bound slough winds sinuously through the Don Edwards San Francisco Bay National Wildlife Refuge, skirting the southwest edge of the large hillside that the Refuge headquarters sits atop, along Marshlands Road just south of the Hwy. 84 approach to the Dumbarton Bridge, and past some decommissioned salt ponds. At the point where it crosses the Hetch-Hetchy Aqueduct, the levees stop and it traverses Dumbarton and Audubon Marshes as a more naturally meandering channel before flowing out to the bay. The fringing marsh upstream of the Refuge headquarters is very wide on the north side of the channel, and contains an extremely high density of gumplant (*Grindelia stricta*) that dominates large areas of the pickleweed marsh plain. Fringing channel bank marsh habitat borders the waters of the channel along the remainder of its length, often dropping off steeply at the channel's edge. A public trail provides recreational access to the upper portion of the slough from the Refuge headquarters, but the lower reaches are closed to the public.

Treatment Entity:

US Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicle
- Backpack sprayers
- Truck

Treatment Approach:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Most of the invasive *Spartina* along Newark Slough is right down on the banks near the mean high water mark, the zone where the native *Spartina* also thrives. The airboat will move along the edge at a moderate tide to avoid having to stay full throttle to keep from slipping back down the steep mud slopes below the vegetation. All remaining patches of hybrid *S. alterniflora* will be treated from the airboat, and if larger clones are found the applicator will jump off the airboat to also treat the back side of the patch to ensure full coverage. If any more distant plants need to be treated, the applicator can haul out up to 300 ft of hose or alternately don a backpack sprayer to complete the work.

There are several areas of this site that require a different treatment approach and additional equipment to complete the application. The first is the side channel near Crescent Pond downstream of the second footbridge over Newark Slough. This channel was heavily infested with hybrid *Spartina* and was first treated in 2009. Most of the channel is too far from Newark Slough to reach with even the fully outstretched airboat hose. A crew will bring an Argo in from the adjacent Marshlands Rd at the western end of this side channel and drive along the weed-infested levee to the eastern end to begin treatment. They will work back along the northern side of the channel, spraying plants directly from the Argo when appropriate or parking at a hub and hauling hose out to treat the surrounding plants. Since efficacy was very high from the first application in 2009, two applicators with backpacks walked along the channel hitting tiny *Spartina* plants below the banks. As the eradication progresses at this area of the site, the Argo may just be used as support to refill the backpacks which will conduct the entire application.

The two other areas that are unique within this site are just upstream and just downstream of the boat launch off Thornton Ave. The upstream polygon is right off Thornton across from Mayhew's Landing (Site 5e) and will be treated by truck and hose supported by backpacks if needed. The downstream polygon is just south of Marshlands Rd and includes the major side channel off Newark Slough that feeds La Riviere Marsh (Site 5d). This will be treated in a similar fashion, with truck and hose staged along the road with support from backpacks for any plants beyond reach. As these two areas approach eradication, backpacks should be sufficient to complete the treatment. Any hybrid *Spartina* along the main channel of Newark Slough adjacent to these areas will be treated by airboat.

Site 5d – La Riviere Marsh

Site Description

LaRiviere Marsh is a 118-acre muted tidal marsh that was restored from a salt crystallization pond in the 1980's. It is located south of the toll plaza for the Dumbarton Bridge (Hwy. 84) between Thornton Avenue and Marshlands Road at the base of the hill where the headquarters of the Don Edwards San Francisco Bay National Wildlife Refuge is located. An unpaved levee with a recreational trail and relatively narrow footbridge runs roughly north-south through the western portion of the marsh. There are still a number of other levees and various features that harken back to the days of its use for salt production, including a narrow canal bordered by dikes that now has thin strips of marsh vegetation on either bank. Large areas of the marsh are dominated by alkali bulrush (*Bolboschoenus maritimus*), characteristic of the brackish conditions of this

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

mented site. Other types of marsh habitat that have developed in this marsh include open mudflat and pans, pickleweed and *S. foliosa* marsh, and gumplant (*Grindelia stricta*) along well-drained channel edges that are punctuated with small upland islands leftover from before the restoration. The marsh is dedicated to Florence and Philip LaRiviere who headed the efforts of the Citizen's Committee to Complete the Refuge that succeeded in persuading Congress to expand DENWR to 43,000 acres in the 1980's making it the largest urban wildlife refuge in the country.

Treatment Entity:

US Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: August 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicles
- Backpack sprayers
- Truck

Treatment Approach:

Hybrid *Spartina* was very successful at colonizing and thriving at this site, and while some sections have been thoroughly treated over the past few years, other portions suffered from inadequate equipment that did not enable the applicators to reach the central portions in an efficient and effective manner. A new control strategy was developed by ISP in 2010 and implemented by two separate entities that could combine technologies and staff capabilities to comprehensively treat the entire site for the first time.

The worst remaining portion of the infestation is the long tidal ditch that runs northeast from the levee trail out to Thornton Ave. The MarshMaster amphibious tracked vehicle will drive down onto the marsh plain from just south of the footbridge along the main trail, and will access the berm on the south side of this ditch and follow it out to Thornton Ave spraying down onto the target *Spartina* from the deck. About midway along the ditch there is large polygon where another ditch used to intersect before the restoration, and this area was still a meadow of hybrid *Spartina* in 2010. At this point the applicators will haul the hose out from the MarshMaster and walk around the meadow treating all of the cordgrass. The MarshMaster can be refilled from a truck staged on Thornton Ave to limit the impact to the marsh surface from repeated trips, and will then work its way back to the central marsh infestation that is beyond the reach of even the 600 ft hose that has been used at this site over the past few years. Backpack sprayers can radiate out to scattered points around the edges and come back to the vehicle to refill. The truck and hose will be used to treat the rest of the infestation on the west side of the main trail

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

supported by backpacks if needed, and these methods will also be applied to the polygon of marsh on the north side of the footbridge. This area can be accessed from the Refuge maintenance yard near the headquarters building.

Site 5e – Mayhew’s Landing

Site Description

Mayhew’s Landing is a 70-acre restored, muted tidal marsh located south of Hwy. 84 and to the east of Thornton Avenue near the headquarters of the DENWR. The marsh is bordered to the east by residential land use and Bridgepoint Park in the City of Newark, and to the north and southeast by more recent developments of single-family houses. Mayhew’s Landing marsh is connected to tidal action by a small channel running south under Thornton Ave. to Newark Slough. The area is brackish and much of it is dominated by cattails (*Typha* sp.), alkali bulrush (*Bolboschoenus maritimus*) and other marsh plants that are characteristic of moderate salinity. A narrow constructed flood control channel enters the site from the eastern neighborhoods and flows to a ponding area before continuing southwest to the channel to Newark Slough. There are additional open water areas in the southeast corner, and numerous upland habitat islands throughout the marsh.

Treatment Entity:

US Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

The majority of the infestation at Mayhew’s is located in the southern third of the marsh within 250 m of Thornton Ave or accessible from a levee that borders the Cargill Marsh (W Hotel) that will be discussed under Site 5g. A truck will stage along these edges and the applicators will haul hose out to the points under guidance of ISP personnel with GPS data from the recent inventory. Any plants outside reach of the hose will be treated by backpack.

Site 5f – Coyote Creek

Site Description

The Coyote Creek sub-area is a 1,100 acre site along the northern banks of Coyote Creek in Alameda County from the eastern edge of Calaveras Marsh (Sub-area 05a) extending upstream along Mud Slough to Arroyo Agua in the City of Fremont. This site includes the Island Ponds A19-A21 (Station Island) at the confluence of Mud Slough and Coyote

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Creek that have recently been breached and returned to tidal exchange as part of the South Bay Salt Ponds Restoration. This large area of marshland contains a diversity of habitats, including extensive mudflats, large stands of tule (*Schoenoplectus americanus*), channel banks, mixed pickleweed (*Sarcocornia pacifica*) marsh plains, and native *Spartina* meadows.

Treatment Entity:

US Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack

Treatment Approach:

While there are still substantial infestations of hybrid *Spartina* at the neighboring Calaveras Marsh and several concentrations across Coyote Creek in Santa Clara County, there is very little invasive cordgrass within this ISP sub-area. A few plants were treated at the mouth of Mud Slough in 2010 by airboat, as well as two others near the mouth of Pond A21; none has been found within the Island Ponds to this point although it can be very hard to identify hybrid from native until the plants have reached sufficient size. The airboat will continue to be used to treat any hybrid *Spartina* found at this site, and can be used for a ground-level survey (to complement the helicopter survey) of the interior of the island ponds to make sure they are kept free of the invader.

Site 5g – Cargill Pond (W Hotel)

Site Description

This site is a restored, muted tidal marsh pond area bordered by Thornton Avenue on the west, Gateway Boulevard to the north, the W Hotel to the east, and Kiote Drive to the southeast in the City of Newark just east of LaRiviere Marsh (Sub-area 05d). A wide upland berm runs north-south through the site and divides it into two marsh sections. The site is connected to tidal exchange by a wide ditch that runs south from this berm 525 meters and under Thornton Ave. to Newark Slough. The ditch flows directly into the western half of the site, whereas the eastern half is connected by a breach in the upland berm. Much of the marsh is mudflat at low tide, with patches of pickleweed (*Sarcocornia pacifica*) and *S. foliosa* scattered throughout higher elevation spots in the center, and a band of pickleweed, native *Spartina* and gumplant (*Grindelia stricta*) around the perimeter.

Treatment Entity:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

This site contains some very soft mud in the two ponded areas that are bisected by a wide levee down the center of the site. The infestation of hybrid *Spartina* is located along the edges of this levee and around the perimeter of the site where the elevation is more amendable to the cordgrass. There have also been stands along the channel that connects this site to Newark Slough on the other side of Thornton Ave. In 2010, some of the areas of cryptic hybrid matured and allowed detection and subsequent treatment. ISP personnel will map the hybrid *Spartina* in this marsh and it will be treated by a team of applicators with backpack sprayer.

Site 5h – Plummer Creek Mitigation Marsh

Site Description

This is a new sub-area within the Site 5 complex that was first treated in autumn 2010. This is an 18-acre marsh near the upper tidal extent of Plummer Creek that is a mitigation site owned and managed by Wildlands Inc. The site is located off Hickory St., about 600m southwest of the intersection of Willow St. and Central Ave. in Newark. The marsh has one main channel running north-south through the center of the site, and the rest of the area is generally marsh plain elevation. Due to its location this far up Plummer Creek, the site contains an abundance of brackish marsh vegetation dominated by alkali bulrush (*Bolboschoenus maritimus*).

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

While the infestation of hybrid *Spartina* at this site is relatively small, it is scattered widely over a significant proportion of the marsh, with the most established stands along the channel. ISP personnel will map the hybrid *Spartina* in this marsh during inventory monitoring and it will be treated by backpack sprayer.

Emeryville Crescent TSN:ISP-2004-06

Sub-Area 06a: Emeryville Crescent East

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381;
Peter Alexander, (510) 544-2342.

Site Description

The Emeryville Crescent marsh is a 105-acre, fringing mixed pickleweed (*Sarcocornia pacifica*) marsh shoreline between Powell Street in Emeryville and the eastern landfall of the Oakland Bay Bridge. The marsh contains significant open mudflat areas along its Bayward edge, the delta of Strawberry Creek, small sinuous channels, freshwater willow thickets, sand/shell beaches, and a complex delta-like tidal exchange area in the western portion of the marsh. The site abuts an extremely heavily developed area on the east side of the Bay, with Interstate 80/580 directly adjacent to the east, and the approach to the San Francisco Bay Bridge adjacent to the south. Local anglers, dog-walkers, and other recreational groups frequently use the marshlands included in this site. Illegal activities such as dumping and littering, unauthorized camping, and public inebriation also occur along the edges of, and sometimes within, the marshlands of this site.

The Emeryville Crescent East area, at 59 acres, includes all areas to the south of Powell Street in Emeryville, continuing south and west around the “crescent” formed by the interstate to roughly the last offramp of westbound I-80 before the toll plaza. The sub-area is comprised of a stretch of coarse sand/shell beach edged by up to a 100-foot wide, undulating band of native *S. foliosa*/pickleweed fringe marsh.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayers
- Amphibious vehicles

Treatment Approach:

Treatment crews will access the marsh plain utilizing the frontage road running along the south side of the marsh and the access road to the radio towers on the west side of the marsh. Crews will use the Hydrotraxx tracked amphibious vehicle to move to treatment areas within the marsh plain where appropriate, spraying larger stands from the vehicle. Smaller clonal patches and scattered plants will be treated via backpack sprayer, using the Hydrotraxx as support where necessary.

Sub-Area 06b: Emeryville Crescent West

Conservancy Grant Recipient:

California State Department of Parks and Recreation

Site Responsible Entity:

California Department of Parks and Recreation (CDPR). 845 Casa Grande Road, Petaluma, CA 94954; Christina Freeman, Environmental Scientist, Diablo Vista District, (707) 769-5652 x. 209.

Site Description

Emeryville Crescent West, at 45 acres, includes those areas of the Crescent south of Powell Street in Emeryville, around to the start of East Bay Regional Parks lands, which is roughly even with the last exit from I-80 westbound before the Toll Plaza. The area contains a relatively complex suite of tidal marsh environments from open mudflats, coarse sand-shell beaches, mixed *Spartina foliosa*/pickleweed mid-marsh, channel/creek mouths and willow-dominated brackish upland transition.

Treatment Entity:

Private contractor through competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Treatment crews will access the marsh plain via Powell Street in Emeryville, along the north-south I-80 onramp running along the east border of the marsh, the shoulder of I-80

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

westbound, and the frontage road running along EBRPD lands at the western end of the area. Treatment crews will use backpack sprayers for treatment, walking the marsh plain to access the target plants.

Oro Loma Marsh TSN:ISP-2004-07

Sub-Area 07a: Oro Loma East

Conservancy Grant Recipient:
East Bay Regional Parks District

Site Responsible Entity:
East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381;
Peter Alexander, (510) 544-2342.

Site Description

Oro Loma Marsh is a large, 324-acre, restored salt pond located on the eastern shore of the San Francisco Bay Estuary adjacent to the town of San Lorenzo, about 1.5 miles south of the Metropolitan Oakland International Airport. The marsh is surrounded by levees, with Bockmann Channel and Sulphur Creek bordering the marsh to the north and south respectively. The San Francisco Bay Trail, a multi-use public recreational pathway, utilizes the levee to the west of Oro Loma, and the Southern Pacific Railroad borders the marsh to the east. The surrounding area includes various industrial and commercial developments to the north and south including a sewage treatment plant, electrical substation, and capped landfill. Beyond the railroad to the east are residential developments, the Skywest Golf Course, and Hayward Municipal Airport, with I-880 approximately 0.5 mile from the marsh edge.

The marsh is comprised of young *Spartina* and pickleweed habitat in newly deposited and areas of extremely soft bay mud. For the purposes of this plan, the levee that partially bisects Oro Loma Marsh from north to south is used to divide the site into eastern (7a) and western (7b) sub-areas. The western half of the marsh along the bay is less vegetated than the eastern half, and both contain networks of channels as well as some man-made sloughs.

The Oro Loma Marsh East sub-area includes the 194-acre marsh east of the central bisecting levee. The marsh is composed of mixed pickleweed plains interspersed with wide mudflats and channels of various sizes. In the easternmost portion of the marsh, the pickleweed-dominated higher marsh forms wide meadows. The constructed channels throughout this sub-area drain into Sulphur Creek to the south, as well as between the breached levee system that separates the two portions of Oro Loma. The dominant substrate in this area is soft bay mud except in the channel bottoms which are more armored.

Treatment Entity:
East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Truck
- Airboat

Treatment Approach:

Access to the interior portions of Oro Loma East comes from the peripheral access road on the easternmost border of the marsh, and via levees that come from the north and south and run under the powerlines that separate the two sections of the marsh. Treatment crews will use these access routes to maneuver equipment and personnel into areas appropriate for the various treatment methods. Truck-mounted spray equipment will treat all areas within the radius of the hose reel and supply amphibious vehicles, airboat and backpack sprayers where necessary. Backpack sprayers will treat the bulk of the area, especially in the northern half of the marsh, where the non-native *Spartina* infestation is most scattered. The Argo will be used to move personnel into place for treatment and to target larger stands of non-native *Spartina* for direct treatment, especially in the areas of larger clonal patches, as in the southern portion of the marsh. The airboat will be used to treat areas of soft mud, channels and other difficult to access interior sites within the marsh. The airboat will also be used, as necessary, to ferry personnel and supplies, and re-fill backpacks or Argo tanks for continued work.

Sub-Area 07b: Oro Loma West

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; Peter Alexander, (510) 544-2342.

Site Description

The Oro Loma Marsh West sub-area includes the 129-acre marsh west of the central bisecting levee. Much of this area consists of open mudflat that is being colonized by pickleweed stands and *Spartina*. The marsh drains to the bay through a wide opening in the Bay Trail levee system that runs along the western side of the marsh and separates the marsh from the open waters of the Bay. This portion of the marsh contains wide channels both constructed before breaching as well as naturally developed since the area was restored to full tidal action.

Treatment Entity:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Helicopter
- Backpack sprayers
- Amphibious vehicles
- Truck
- Airboat

Treatment Approach:

The periphery of the marsh will be treated via spraytruck, with the applicators targeting all non-native *Spartina* plants within the radius of the hose reel. This includes the edges of Sulphur Creek and Bockmann Creek where applicable. The interior of the marsh, a more open marsh setting, with scattered non-native *Spartina* and mudflats, will be treated via airboat predominantly. Where the density of the remaining *Spartina* is sufficient to justify aerial applications, helicopter will be used to augment ground-based treatment work. Some use of backpack sprayers will be employed where the airboat cannot reach or where the target infestation is less dense. The Hydrotraxx amphibious vehicle will likely not be a main method of treatment in this portion of the marsh, but may be utilized to ferry equipment and personnel to locations within the marsh or to assist the airboat in treatment work.

Palo Alto Baylands TSN: ISP-2004-8

Conservancy Grant Recipient:

City of Palo Alto

Site Responsible Entities:

City of Palo Alto, 1305 Middlefield Road, Palo Alto, CA 94301; *Daren Anderson*,
Division Manager Parks, Open Space & Golf, (650) 496-6950,
daren.anderson@cityofpaloalto.org.

Site Description

The Palo Alto Baylands site is part of a 1,940-acre nature preserve and park complex, one of the largest tracts of undisturbed marshland remaining in San Francisco Bay. This park is owned and managed by the City of Palo Alto and is located approximately 2.5 miles south of the Dumbarton Bridge, east of Hwy. 101 at the end of Embarcadero Road. The

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

site is bordered to the north and west by San Francisquito Creek, a watercourse that was straightened and bounded by earthen levees. Within the site, Harriet Mundy Marsh is a peninsula vegetated with pickleweed (*Sarcocornia pacifica*), *S. foliosa*, and gumplant (*Grindelia stricta*) that extends out to Sand Point from the main parking area. There is a restored marsh cove to the southwest of the parking area that was once home to a yacht club and a Sea Scouts program before it was allowed to silt in and return to marshland. Hooks Island just offshore from Mayfield Slough is a pickleweed marsh with large areas of *S. foliosa* that have been colonized in recent years by large, circular clones of alkali bulrush (*Bolboschoenus maritimus*), although the health of the bulrush fluctuates with annual rainfall and appears to be staying in balance with the native cordgrass distribution on the site. The park has high visitation on the 15 miles of established trails through the marsh, houses the Lucy Evans Baylands Nature Interpretive Center, and is a favorite spot for birdwatchers, naturalists, local schools, wind surfers, kayakers, anglers, bikers and runners.

This site has had an unusually high percentage of cryptic *Spartina* plants that can be challenging to identify; some of these went undetected until recently and probably served to expand the infestation at the site. Over the past five years, the channel between Hooks Island and the mainland has been getting more and more clogged with *Spartina* growth (both hybrid and native) as well as trapped sediment, so much so that you can't get a canoe through anymore except at very high tides.

Treatment Entity:

City of Palo Alto (contractor TBD)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: August 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

This diverse site requires three to four separate efforts spaced over several days to treat everything during appropriate tides. The main infestation continues to be at the southeastern end of Hooks Island. Because of the soft mud in the narrow channel between the mainland and the island, the contractor has treated this area with a powersprayer and a long hose from a truck staged on the nearby levee. The rest of Hooks Island is treated by backpack sprayers. The crew lays down some lumber on the soft mud to get across, and can use the PG&E boardwalk along the north end of the island to move laterally over the wider channels. These applicators are accompanied by ISP personnel with the most recent inventory data displayed on their GPS units.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The other areas that can be accessed directly from the surrounding upland are the marshes surrounding the parking area for the Environmental Education Center. Included in this area is Mundy Marsh which was treated by Santa Clara Valley Water District through 2010 (the final year of their commitment) as a mitigation measure for their Stream Maintenance Program. The scattered hybrid *Spartina* patches in these areas will be treated by backpack sprayer, again guided by ISP monitoring data to limit impacts and ensure thorough coverage.

There are islands that have accreted in Adobe Creek near the Sea Scouts building, due east of the intersection of Embarcadero and Harbor Roads. A boat must be used to cross over onto these patches of marsh, and experience from 2010 treatment illustrated just how silted the surrounding channels are and how high the tide must be to reach the infestation. Applicators with backpack sprayers will launch a boat at Byxbee Park and motor around to the various infestation points mapped by ISP. A 6.5 ft tide or greater is probably necessary to reach some of the tiny islands just off the mainland, and the application should occur either at the apex of the high tide or as it recedes so the necessary dry time is achieved.

Finally, San Francisquito Creek could be treated by an applicator walking the adjacent levees with a backpack. There is very little hybrid *Spartina* along this creek channel so the efforts could be focused only where the ISP has mapped hybrid. If necessary, the work could also be done by boat, but this would most likely have greater constraints than the backpack work.

Tiscornia Marsh (formerly Pickleweed Park) **TSN: ISP-2004-9**

Conservancy Grant Recipient:
California Wildlife Foundation

Site Responsible Entities:
Marin Audubon, PO Box 509, Mill Valley, CA 94942; Barbara Salzman, 415.924.6057, bsalzman@att.net

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeoundation.org.

Site Description

Tiscornia Marsh is a 20-acre site that borders City of San Rafael's Pickleweed Park to the west. In 2008, Mary Tiscornia donated the marsh to Marin Audubon Society, but prior to that it was managed by the City as part of their adjacent 18-acre park. It is located on the shoreline of San Rafael Bay, bounded to the north by the San Rafael Canal mouth, to the south by the multi-use trail at the east end of Canal Street, and is contained by levees on its western upland edges. This remnant marsh patch consists of a small pickleweed

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

(*Sarcocornia pacifica*) plain fed by a sinuous channel entering on the north shoreline; this channel appears to have been altered into a straight ditch near the center of the marsh and runs the rest of the way to the southern levee in this manner. The eastern edge is a 4-5 foot scarp down to mudflats that extend out hundreds of meters at a very shallow angle, so at low tide they seem to stretch all the way to the Marin Islands National Wildlife Refuge. The marsh tapers at its south end to a very thin band along the toe of the levee; this is the point where Tiscornia Marsh ends and Starkweather Park (Site 231) begins. There are two PG&E powerline boardwalks, one running 72 m east from the levee road out over the marsh scarp to the tower resting on the mudflats, and a second heading north 50 m ending at the tower on the upper edge of the *S. foliosa* band. The adjacent Pickleweed Park is heavily used by the public, with ball fields, a community center, playground, and a multi-use recreational trail.

The ISP control work at this site has followed a true Integrated Pest Management (IPM) strategy from the start, with a large manual removal effort in 2004 supported by herbicide applications in the following years to contain spread and eliminate the larger mature plants. However, since this is a California clapper rail breeding site, ISP could not conduct any treatment activities here until after September 1 each year, at which point the *S. densiflora* had all set seed and begun to senesce. That strategy has been revised and remedied and the site is well on its way to local eradication of the two types of non-native cordgrass that colonized here.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

Both forms of invasive *Spartina* at Tiscornia Marsh (*S. densiflora* and hybrid *S. alterniflora*) are at very low levels and are on the verge of local eradication. Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

Several clones of hybrid *S. alterniflora* were lurking amongst the band of native *S. foliosa* on the north end of this site along San Rafael Canal Mouth, and these were finally detectable in the summer of 2009 and subsequently treated. There has also been some hybrid in the channel just south of the boardwalk, as well as one clone below the eastern marsh scarp. All of these have previously been treated, but if any retreatment is required or new hybrid is found, they will be addressed with backpack sprayer.

Point Pinole Marshes **TSN: ISP-2004-10**

Conservancy Grant Recipient:

East Bay Regional Parks District (EBRPD)

Site Responsible Entities:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland, CA 94605-0381; *Peter Alexander, Fisheries Specialist*, (510) 544-2342, palexander@ebparks.org.

Site Complex Description

Point Pinole Regional Shoreline is a 2,315-acre multi-use park owned by the East Bay Regional Parks District (EBRPD). It is located at the northwestern corner of the City of Richmond, in Contra Costa County, bordered to the south and east by the Union Pacific Railroad. Point Pinole opened to the public in 1973 after the property was acquired from Bethlehem Steel. Bethlehem had acquired the land in the early 1960s from Atlas Powder Co., one of several firms that had manufactured gunpowder and dynamite there for almost 100 years.

The park occupies a roughly triangular peninsula on eastern San Pablo Bay that contains a large upland core with open, grassy parklands interspersed with predominantly eucalyptus woodlands. Along the northern shoreline of the park east of the point is the relatively intact Whittell Marsh (Sub-area 10a) composed mainly of high marsh pickleweed (*Sarcocornia pacifica*). Along the western shoreline there is a narrow band of tidal marsh on the south side of a bend in the shoreline. This is referred to as Southern Marsh (Sub-area 10b), which grades quickly over a 10-20 meter span from high marsh pickleweed to sandy mudflat. Giant Marsh (Sub-area 10c) is a larger remnant pickleweed marsh located at the southwestern corner of Point Pinole Regional Shoreline. It contains a network of narrow, manmade channels which may have been used to drain the site for hay production.

Site 10a – Whittell Marsh

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Whittell Marsh is a 40-acre marsh located on the northern shore of Point Pinole Regional Shoreline 600 meters east of the point. It is comprised of a wide section of pickleweed (*Sarcocornia pacifica*) and gumplant (*Grindelia stricta*) high marsh extending out to the bayfront from a mainly non-native eucalyptus-dominated upland. The bayward edge on the eastern side of the marsh has been undercut by wave action from open exposure to the North Bay creating a steep scarp down to sandy substrate, whereas the remainder of the shoreline contains a sloping sandy beach down to the mudflat elevation. There is one large channel in the western half of this marsh as well as a network of smaller channels providing foraging habitat; most of the larger channels were altered by humans and consequently now represent straight ditches. This site also includes a series of smaller marshes within Point Pinole Regional Shoreline that begin 500 meters to the east along the North San Pablo Bay shore.

Treatment Entity:

East Bay Regional Parks District (EBRPD)

Spartina Species Present:

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

Since ISP and EBRPD began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped substantially at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

Site 10b – Southern Marsh

Site Description

The Southern Marsh site at Point Pinole Regional Shoreline contains an estimated 10 acres of mixed tidal fringe marsh and mudflat along the southern portion of the peninsula just north of Giant Marsh (Site 10c). The small remnant marsh patch at the center of the site is narrow, grading from pickleweed-dominated high marsh to gravelly mudflat over a less than 70 m. Interspersed within the marsh are sizeable areas of cobble, devoid of vegetation. About 100 m south of the marsh is a band of *S. foliosa* that runs for 210 m

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

and is about 40 m wide on average. The infestation at this site contains both *S. densiflora* and hybrid *S. alterniflora*.

Treatment Entity:

East Bay Regional Parks District (EBRPD)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicle
- Backpack sprayers
- Manual removal

Treatment Approach:

This site contains long strips of *S. foliosa* fringe marsh that have been invaded by hybrid *Spartina*. Some of the invasive clones have been quite large in previous years which required a substantial volume of product to treat them thoroughly. Amphibious tracked vehicles have been used to efficiently complete the job on this site to meet the need for greater product capacity, and because the substrate is firm and not adversely impacted by the tracks. EBRPD will continue to use their Hyrdotrax to treat the hybrid *S. alterniflora* on this site until the infestation is either eradicated or down to low enough levels to justify a switch to backpack sprayer. Any seedlings or resprouts of *S. densiflora* found within Southern Marsh will be removed manually, and the site will receive two annual rounds of surveys by ISP biologists to maintain the eradication of this species.

Site 10c – Giant Marsh

Site Description

Giant Marsh is a 30-acre pickleweed marsh in the far southern tip of Point Pinole Regional Shoreline on San Pablo Bay. The Union Pacific Railroad borders the marsh to the east, with the parking lot for Point Pinole just beyond. Along the shoreline to the south are the fringe marshes at the mouth of Rheem Creek (Site 22c in the Two Points Complex), and Southern Marsh (Site 10b) is contiguous to the north. Giant Marsh has the scars of a system that was manipulated by humans for commercial purposes. There are several large channels that appear to have been straightened and there are old eroding levees that criss-cross the marsh plain in the northern portion. The marsh plain ends abruptly near the mean high tide line and drops about two feet to sandy substrate and a band of *S. foliosa* that has colonized the accumulated sediment at the mouth of the main channel above the mudflat. This native cordgrass band extends for about 65 m on either side of the channel and sprawls out onto the mudflat for about 30 m.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

As with its neighbor site to the north, Giant is infested with cryptic plants and both the hybrid and native *Spartina* exhibit a range of morphologies which complicates identification and treatment. Interestingly, although the *Spartina* infestation has been present here for years, it has only recently moved to the interior of Giant Marsh, even along the network of ditch-straight channels that criss-cross the marsh plain. Although both Southern and Whittell Marshes have *S. densiflora*, only a plant or two ever colonized the shoreline of Giant Marsh, so the infestation here is really only composed of hybrid *S. alterniflora*.

Treatment Entity:

East Bay Regional Parks District (EBRPD)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

As with the smaller Southern Marsh site above, the infested area of Giant Marsh is along the shoreline where the habitat is comprised of long bands of *S. foliosa* fringe marsh that have been invaded by hybrid *Spartina*. Some of the invasive clones have been quite large in previous years which required a substantial volume of product to treat them thoroughly. Amphibious tracked vehicles have been used to efficiently complete the job on this site to meet the need for greater product capacity, and because the substrate is firm and not adversely impacted by the tracks. EBRPD will continue to use their Hydratrax to treat the hybrid *S. alterniflora* on this site until the infestation is either eradicated or down to low enough levels to justify a switch to backpack sprayer. To treat the few plants that moved up the main channel in 2010 towards the interior, the applicator will haul hose out from the Hydrotrax or will don a backpack if the plants are beyond reach of the hose. Any seedlings of *S. densiflora* found within Giant Marsh will be removed manually, and the site will receive two annual rounds of surveys by ISP biologists to maintain the eradication of this species.

Southampton Marsh

TSN: ISP-2004-11

Conservancy Grant Recipient:

California Department of Parks and Recreation

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Responsible Entities:

California Department of Parks and Recreation, Diablo Vista District, 845 Casa Grande Road, Petaluma, CA 94954; *Christina Freeman*, *Environmental Scientist*, (707) 769.5652 ext 209, cfreeman@parks.ca.gov.

Site Description

Southampton Marsh is the largest extant marsh within the Carquinez Strait. Its roughly 175 acres are located within the 720-acre Benicia State Recreation Area in Solano County. Highway 780 borders the park on the north and east, with Southampton Bay along the Carquinez Strait to the south, and residential development in the City of Vallejo sits atop the hill to the west of the park. Cyclists, runners, walkers and roller skaters use the park's 2 ½ miles of road and bike paths on the perimeter of the park.

The marsh lies in the central portion of the park extending down to its southern shoreline on Southampton Bay, and consists mostly of high marsh pickleweed (*Sarcocornia pacifica*) and gumplant (*Grindelia stricta*) habitat, with dense edges of brackish marsh species at the base of the western hill and along the bay, including tule (*Schoenoplectus californicus*), cattails (*Typha* sp.) and alkali bulrush (*Bolboschoenus maritimus*). A deep main channel flows north-south through the center of the marsh, with several smaller channels branching from it that are lined with the highly invasive perennial pepperweed (*Lepidium latifolium*) that has displaced the native gumplant that would normally be found on these well-drained banks.

Southampton Marsh is one of the few remaining sites of the endangered plant species *Cordylanthus mollis* ssp. *mollis* (soft bird's-beak). The *Cordylanthus* can be found along some of the smaller channels in the southern portion of the site, and in some of the high marsh areas in the north. Access to the marsh is restricted to park personnel and researchers to protect the endangered plant population from potential damage from trampling.

Southampton Marsh contains the only known population of *Spartina patens* in the San Francisco Estuary, and the presence of another unusual eastern North America native, *Juncus roemerianus*, suggests that they were both probably planted here anonymously. The non-native *Spartina* infestation at this site used to consist solely of *S. patens*, but ISP has discovered several clones of hybrid *S. alterniflora* along the shoreline in recent years.

Treatment Entity:

California Department of Parks and Recreation (contractor TBD)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Spartina patens

***Treatment Timing:* DISCUSSION ONGOING WITH STATE PARKS**

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Hybrid *S. alterniflora*: July 15 through the end of treatment season

Spartina patens: After July 15 for plants distant from *Cordylanthus mollis mollis*, whereas treatment on plants growing with *C. mollis mollis* will need to occur in August.

Treatment Methods:

- Backpack sprayers
- Herbicide swipers/wicking
- Manual removal

Treatment Approach: DISCUSSION ONGOING WITH STATE PARKS

ISP treatment at Southampton Marsh has always occurred over two events each year. The *Spartina patens* growing away from any of the endangered annual *Cordylanthus mollis mollis* was treated with imazapyr in the summer during the normal season, whereas plants growing with *C. mollis mollis* have historically been treated with glyphosate in autumn after the rare plant had set seed. When hybrid *S. alterniflora* was discovered recently on the site, its treatment was scheduled during the first visit (fortunately this infestation is located mainly along the shoreline away from the *Cordylanthus*). Although the *S. patens* infestation was reduced significantly after just two seasons of control work (2005-2006), it has not continued to decrease at a satisfactory rate because the autumn treatment allows invasive seed to be produced which re-infests the site. *S. patens* is also beginning to senesce by this time so the herbicide efficacy is significantly reduced. ISP is working with State Parks to develop a new strategy that will utilize the proper treatment timing and will incorporate new treatment methods that will eradicate *S. patens* while minimizing adverse impacts to the *Cordylanthus*. These methods might include swiping or wicking on herbicide to eliminate overspray and the unavoidable collateral damage to a contiguous plant. Hand pruning of *S. patens* may be used to stop intra-site seed dispersal, possibly with hand digging to carefully remove roots. Backpack sprayers will continue to be used on hybrid *S. alterniflora* as well as *S. patens* that is not near *Cordylanthus*.

Southeast San Francisco Complex

TSN:ISP-2004-12

Complex Description

The Southeast San Francisco Complex includes a scattered group of remnant marshlands within a heavily industrialized landscape on the western shores of the San Francisco Bay Estuary. The complex is bounded by the Treasure Island and Yerba Buena Island in the north, and the San Francisco County and City boundaries to the south. The Southeast San Francisco complex is adjacent to an inactive naval shipyard, shipping container facilities, and Monster Park stadium (formerly Candlestick Park), as well as the Bayview residential neighborhood of San Francisco.

The eight sub-areas of the Southeast San Francisco complex contain many scattered, small, individual clonal populations of *Spartina alterniflora* hybrids according to the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

ISP's 2007 *Spartina* Inventory Map. The largest area within this complex is the Yosemite Slough area, which has a large proportion of native *Spartina* plants as a result of the targeted treatment of non-native *Spartina* at the site since 2004. The individual patches of non-native *Spartina* within this area represent localized 'stepping stones' in the available marsh habitat of the area to the open waters of the north bay, and the outer coast. This infestation in Southeast San Francisco is not large on its own but nevertheless represents a significant threat to marshlands in other parts of the San Francisco Bay.

Sub-Area 12a: Pier 94

Conservancy Grant Recipient:
California Wildlife Foundation

Site Responsible Entity:

Port of San Francisco, Pier 1, San Francisco, CA 94111; *Carol Bach, Environmental Health & Safety Manager* (415) 274-0568, Carol_Bach@sfport.com.

Golden Gate Audubon, 2530 San Pablo Ave, Suite G, Berkeley, CA 94702-2047, *Mark Welther, Executive Director*, (510) 843-9912 mwelther@goldengateaudubon.org.

Site Description

Pier 94 is an approximately 5-acre site located just south of the mouth of the Islais Creek Channel, and is bordered by a gravel and aggregate storage/production facility, shipping container terminal and transfer facility, a rendering plant, and other heavy industry. The Golden Gate Audubon Society is restoring the marsh at Pier 94 that consists of tidal pans and high marsh pickleweed (*Sarcocornia pacifica*)/gumplant (*Grindelia stricta*) habitat. Although the site is open to the public, the presence of this remnant marsh patch is not advertised by posted signs, and there is no trail system. Significant restoration work on the site has been accomplished since 2005, including the removal of large amounts of concrete rip-rap, garbage clean-up, regrading, and native plant plantings including the endangered California sea blite (*Sueda californica*).

Treatment Entity:

Private contractor via competitive bidding
Volunteers

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Digging

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

Where larger plants have established in the marsh, treatment personnel equipped with backpack sprayers may be used to target the non-native *Spartina* present in the marsh. Since most of this marsh has a much-reduced *Spartina* component as of 2010, the remaining plants in 2011 and beyond may be able to be simply dug from the marsh using shovels, with the plant material discarded on the upland portions of the site or removed to a landfill.

Sub-Area 12b: Pier 98 – Heron’s Head

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

Port of San Francisco, Pier 1, San Francisco, CA 94111; *Carol Bach, Environmental Health & Safety Manager* (415) 274-0568), Carol_Bach@sfport.com.

Literacy for Environmental Justice (LEJ) 800 Innes Avenue, Unit 11, San Francisco CA. 94124, *Anthony Khalil, Heron's Head Park Naturalist*, (415)282-6840. Anthony.khalil@lejyouth.org.

Site Description

Heron's Head Park (formerly known as Pier 98) is a 25-acre restored wetland northeast of the former location of the Hunters Point Power Plant, south of Lash Lighter Basin at the southeastern end of Cargo Way in the Bayview-Hunters Point neighborhood of San Francisco. Heron's Head is a long, thin peninsula extending southeast into San Francisco Bay that consists of landfill initially slated for development as a Port of San Francisco facility, but now transformed into a thriving marsh maintained by Literacy for Environmental Justice (LEJ). LEJ uses volunteers to plant native plant species, remove non-natives such as invasive *Spartina*, and clean and maintain the wild areas of the park. Heron's Head Park supports over 78 species of birds annually, and acts as a rest stop for migratory birds along the Pacific Flyway.

The area marshland areas consists mostly mid-marsh habitat with numerous pans draining to the south and rip-rap marsh edge. To the northwest, a tidal pond abuts the former PG&E power plant and Jennings Street. There is a public recreational trail through the center of the peninsula that is frequently used by joggers, dog walkers, anglers and birdwatchers.

Treatment Entity:

Private contractor via competitive bidding
Volunteers

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Digging

Treatment Approach:

Where larger plants have established in the marsh, treatment personnel equipped with backpack sprayers may be used to target the non-native *Spartina* present in the marsh. Since most of this marsh has a much-reduced *Spartina* component as of 2010, the remaining plants in 2011 and beyond may be able to be simply dug from the marsh using shovels, with the plant material discarded on the upland portions of the site or removed to a landfill.

Sub-Area 12c: India Basin Shoreline Park

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

City of San Francisco Recreation & Parks (SFRP), McLaren Lodge, 501 Stanyan Street, San Francisco, CA 94117-1898; *Lisa Wayne, Natural Areas Director, (415) 753-7266.*

Site Description

The India Basin area includes a 2-acre marsh/mudflat in a small cove several hundred feet to the north of India Basin Shoreline Park, a small City of San Francisco park, as well as the adjacent shoreline to the south to the end of Donahue Street. The site is located southwest of Heron's Head Park (Sub-area 12b) in the small bay referred to as India Basin on the eastern edge of the Bayview neighborhood of San Francisco. The park receives heavy public use, and the adjacent land uses including a now closed and demolished PG&E power plant as well as residential housing.

Treatment Entity:

Private contractor via competitive bidding
Volunteers

Spartina Species Present:

Spartina alterniflora x foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Digging

Treatment Approach:

Where larger plants have established in the marsh, treatment personnel equipped with backpack sprayers may be used to target the non-native *Spartina* present in the marsh. Since most of this marsh has a much-reduced *Spartina* component as of 2010, the remaining plants in 2011 and beyond may be able to be simply dug from the marsh using shovels, with the plant material discarded on the upland portions of the site or removed to a landfill.

Sub-Area 12d: Hunter's Point Naval Reserve

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

United States of America, Department of the Navy, Office of the Assistant Secretary of the Navy, Base Realignment And Closure Program Management Office West, 1455 Frazee Road, Suite 900, San Diego, CA 92108-4310. *Beth Larson, Local Civilian Representative*, (619) 532-0788. elizabeth.larson@navy.mil.

Site Description

The Hunter's Point area is a peninsula bordered to the north by India Basin and to the south by South Basin and Yosemite Slough. This area contains a decommissioned Naval Base undergoing restoration and conversion to a mixed-use facility. The San Francisco Naval Shipyard and Hunters Point Shipyard were located on this peninsula, and much of that infrastructure is still present. There are approximately 8.8 acres of marshland associated with this site, with the majority represented by a thin band of mostly sandy shoreline bordered by rip-rap. There is a sandy bay in the South Basin near Yosemite Slough with more developed marsh structure, and this is the main area of non-native *Spartina* within the Reserve. This area is considered a US EPA Superfund Site, with high levels of heavy metals and radioactivity in sediments. Access to the shoreline needs to be coordinated through the US Navy and subcontractors working onsite.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

The remaining infestation at Hunter's Point can be treated with backpack sprayers, with treatment crews accessing the infested areas of the marsh from the north and west. Truck-mounted spray equipment may be used where the infestation remains thickest, but otherwise this method will be used to supply backpackers where necessary.

Sub-Area 12e: Yosemite Slough Channel

Conservancy Grant Recipient:

California Department of Parks and Recreation

Site Responsible Entity:

California Department of Parks and Recreation (CDPR). 845 Casa Grande Road, Petaluma, CA 94954; *Christina Freeman, Environmental Scientist, Diablo Vista District*, (707) 769-5652 x. 209. cfreeman@parks.ca.gov.

Site Description

Yosemite Channel is a 12-acre mudflat-dominated marsh located within a heavily industrialized area at the southeast end of Yosemite Avenue in the Bayview-Hunters Point neighborhood of San Francisco, just southwest of the Hunter's Point Naval Reservation, and north and west of Candlestick Point. The site is comprised of a relatively large mudflat with some adjacent higher fringe salt marsh habitat. This sub-area also includes a small area to the east of Yosemite Channel and the Double Rocks feature on the southern shoreline of the South Basin (this area is referred to as the "boat launch" area by California Department of Parks and Recreation staff). There is currently no public use of the site (except perhaps as an illegal dumping area), as the area is primarily fenced off.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Truck

Treatment Approach:

Treatment crews will walk the marsh, treating all non-native *Spartina* found via backpack sprayers. Along the periphery of the marsh where larger stands remain, or where access via backpack could be dangerous to personnel, the hose-reel equipment of the spray truck will be used to treat the marsh.

Sub-Area 12f: Candlestick Cove

Conservancy Grant Recipient:

California Department of Parks and Recreation

Site Responsible Entity:

California Department of Parks and Recreation (CDPR). 845 Casa Grande Road, Petaluma, CA 94954; *Christina Freeman, Environmental Scientist, Diablo Vista District*, (707) 769-5652 x. 209. cfreeman@parks.ca.gov.

Site Description

The Candlestick Cove State Recreation Area encompasses the shoreline and upland areas of Candlestick Point, to the east of Monster Park football stadium. The tidal marsh development along this shoreline is relatively limited, mostly consisting of steep rip-rap with an occasional small cove. *Spartina* in this area is relegated to small scattered clones.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Treatment crews will walk the marsh, treating all non-native *Spartina* found via backpack sprayers. Along the periphery of the marsh where larger stands remain, or where access via backpack could be dangerous to personnel, the hose-reel equipment of the spray truck will be used to treat the marsh.

Sub-Area 12g: Crissy Field

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

Golden Gate National Parks Conservancy, Crissy Field Center, 1199 East Beach, Presidio, San Francisco, CA 94129. *Cristy Rocca*, Center Director, (415) 561-7750. crocca@parksconservancy.org.

Site Description

The Crissy Field area is a restored marsh, dune and beach parkland just to the east of the Golden Gate Bridge and Fort Point in San Francisco. The main area of historical non-native *Spartina* infestation is in the tidal marsh area that constitutes a 2-3 acre portion of the overall site. The periphery of the marshland has been heavily planted with native vegetation, including native *Spartina* from locations in Marin. Only limited amounts of non-native *Spartina* have colonized Crissy Field, and due to the regular monitoring of the restoration effort, these non-native *Spartina* colonizers have been immediately removed.

Treatment Entity:

Volunteers

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Digging

Treatment Approach:

Treatment in this restored marsh will be done by digging up and disposing of all discovered non-native *Spartina*. All plants thus removed will be disposed of in a landfill offsite.

Sub-Area 12h: Yerba Buena and Treasure Islands

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

City of San Francisco

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Description

This site includes all of the shoreline of both Yerba Buena and Treasure Islands in San Francisco. For the most part, the shoreline of Treasure Island consists of steep rip-rap shoreline with very little tidal marsh habitat whatsoever. In contrast, the shoreline of Yerba Buena Island consists of rocky cliffs, sandy beaches and developed shoreline in the form of a marina and Coast Guard dock areas. There is very little tidal marsh vegetation along the shoreline of either island.

The infestation on Yerba Buena Island consists of a single, genetically identified non-native *Spartina* clone on the northeastern shoreline, at the base of a rocky outcrop near the landfall of the Oakland-San Francisco Bay Bridge.

Treatment Entity:

Volunteers

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Digging
- Backpack

Treatment Approach:

The small, single clone present at this site as of 2010 was reduced to a few small sprigs capable of being removed via digging. However, the steep slopes adjacent to the infested area that provide access to the plants make transporting dug materials offsite problematic. Until the plant material targeted for control is reduced to a sufficiently small amount as to be removed from the site, treatment crews will target the non-native *Spartina* for control via backpack sprayers.

Sub-Area 12i: Mission Creek

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

Owner: City and County of San Francisco, Redevelopment Agency, One South Van Ness Avenue 5th Floor, San Francisco, CA 94103. (415) 749-2400.

Manager: MJM Management Group: 275 Post Street, Fifth Floor San Francisco, CA, 94108. *Mission Bay Park Management* (415) 543-9063.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Description:

For the purposes of this plan, Mission Creek is defined as the channel extending roughly 1000 meters southwest from the 3rd Street Bridge on the south side of PacBell Park in San Francisco. The shoreline of the basin is highly developed, including houseboats, public parks, light industrial development, parking lots, walkways and other uses. There is very little tidal marsh development, with the largest portion in the upper part of the channel near I-280, which was constructed as part of the condominium development in the north side of the channel and is part of Mission Bay Park.

Treatment Entity:

Volunteers

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through the end of treatment season

Treatment Methods:

- Digging
- Backpack

Treatment Approach:

Where larger plants have established in the marsh, treatment personnel equipped with backpack sprayers may be used to target the non-native *Spartina* present in the marsh. Since most of this marsh has a much-reduced *Spartina* component as of 2010, the remaining plants in 2011 and beyond may be able to be simply dug from the marsh using shovels, with the plant material discarded on the upland portions of the site or removed to a landfill.

Eden Landing Complex (Whale's Tail Complex)

TSN:ISP-2004-13

Complex Description

The Whale's Tail and Old Alameda Creek Complex is an over 800-acre site situated within Eden Landing on the eastern shores of the San Francisco Bay Estuary, immediately south of the San Mateo Bridge and bordered to the east by Union City and to the south by the Alameda Flood Control Channel. Eden Landing consists largely of old Cargill salt evaporator ponds now managed by a Federal and State-sponsored partnership known as the South Bay Salt Ponds Restoration Project. The two parallel channels of Old Alameda Creek bisect Eden Landing, with the two "flukes" of Whale's Tail consisting of older restoration project marshes found on either side of the mouth at the Bay front. There are a variety of habitats in this diverse area, including mature restoration marsh with a range of channel orders and morphologies, highly-channelized flood control

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

conduits, young restoration sites with little vegetation or structure, mudflats, eroding scarp, and sand/shell beach.

The invasive *Spartina* at the Whale's Tail and Old Alameda Creek Complex is one of the oldest infestations of non-native cordgrass in the San Francisco Estuary. Prior to the start of *Spartina* control work under the ISP in 2004, this site complex contained 82 net acres of *Spartina alterniflora* hybrids representing about 15% of the area. In some places the infestation had become a dense monoculture, and the hybrid *Spartina* had established in a wide variety of marsh habitats and elevations including high marsh pickleweed (*Sarcocornia pacifica*)/saltgrass (*Distichlis spicata*), lower marsh *Spartina foliosa*/mudflat areas, channel banks, edges of salt pans, and bayfront scarps and mudflats.

Sub-Area 13a: North Bank, Old Alameda Creek

Sub-Area 13b: Central Island, Old Alameda Creek

Sub-Area 13c: South Bank, Old Alameda Creek

Conservancy Grant Recipient:

Alameda County Department of Public Works – Flood Control District

Site Responsible Entity:

Alameda County Department of Public Works-Flood Control District, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org*

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; *John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov*

Site Description

The three sub-areas of Old Alameda Creek (sites 13a-13c) have been combined in this Site-Specific Plan due to their contiguity as part of the same watercourse, and their similarities in ownership and management. Old Alameda Creek consists of two parallel manmade channels that begin at the “20-Tide Gates” structure near Union City and run approximately four miles west to the mouth where Old Alameda Creek empties into the Bay. The channels were ditched out of remnant tidal marshland, leaving a 50 m wide central island and 5-15 m wide north and south marsh benches up to the levees. All three sub-areas share the same marsh elevations, hydrologic gradient, and associated plant assemblages. The open mud along the channel banks grades sharply to a thin band of *Spartina foliosa*, with predominantly pickleweed (*Sarcocornia pacifica*) on the benches and gumplant (*Grindelia stricta*) at the toe of the levee and in well-drained areas on the island. The three sub-areas contain approximately 160 acres of marshland.

Treatment Entity:

Alameda County Department of Public Works – Flood Control District

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Amphibious Vehicle

Treatment Approach:

All areas within the creek channel can be treated with a combination of Argo amphibious vehicle and backpack sprayer, with support from spray trucks stationed along the adjacent levees. Argo crews will work along the channel edge, treating all non-native *Spartina* found there, sometimes working from the levee, and other times directly on the pickleweed benches of the channel banks or on the central island. On the island in particular, this method is appropriate to move materials and personnel to the treatment areas. Treatment personnel with backpacks will follow the Argo to treat smaller or missed plants in the channel.

Sub-Area 13d: Whale's Tail, North Fluke

Sub-Area 13e: Whale's Tail, South Fluke

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

The two halves of Whale's Tail have been combined in this Site-Specific Plan due to their proximity and their similarities in ownership and management. The Whale's Tail marshes, located on the eastern shores of the San Francisco Bay Estuary immediately south of the San Mateo Bridge, are a pair of old Cargill salt production ponds that self-restored in 1930. From an aerial view, these two marshes resemble the two flukes of a whale's tail bordering the mouth of Old Alameda Creek to the north and south. The Whale's Tail North Fluke sub-area is a 167-acre marsh bordered to the north by Mt. Eden Creek and to the east by former salt ponds that will be restored as part of the Eden Landing Ecological Reserve and the South Bay Salt Pond Restoration Project. The Whale's Tail South Fluke sub-area is a 156-acre marsh that tapers to a point in the south along shoreline rip-rap, and is bordered to the east by the Cargill Mitigation Marsh.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

These two marshes are quite similar with large mid-marsh plains of pickleweed (*Sarcocornia pacifica*) and scattered pans, with gumplant (*Grindelia stricta*) lining the second and third order channels, and saltgrass (*Distichlis spicata*) at higher elevations. The bayward edge of the marsh consists of a complex, undulating sand/shell beach with an eroding scarp composed of clay and cobble, grading into wide mudflats extending westward into the Bay. Two channels flow through Whale's Tail South Fluke marsh to provide the tidal connection for the adjacent Cargill Mitigation Marsh. The first, in the northern portion of the marsh is the smaller of the two, roughly four to six meters across at its mouth. This channel drains from the northern portion of the Cargill site to the east through a small levee breach. A larger channel parallels the eastern levee, with its origin in a 10m-wide breach in the levee separating at the southwest corner of the Cargill site. The channel runs to a small delta into the bay at the southern end of Whale's Tail South Fluke.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Both of the Whale's Tail Marshes have been treated for the last two years solely via backpack sprayer, and will continue to be treated in this way going forward. Treatment crews walk the marsh plain in a rough skirmish line, treating all non-native *Spartina* present. Support for this work is provided via spray truck working along the peripheral levee system to the east.

Sub-Area 13f: Cargill Mitigation Marsh

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The Cargill Mitigation Marsh sub-area is a 49-acre former solar salt production evaporator pond that was restored by opening the site to muted tidal action in 1995, and full tidal action in 1998. It is bounded on the north by the levees of the Old Alameda Creek channel, on the west by the South Whale's Tail marsh, and to the east and south by recently decommissioned salt production ponds that are part of the Eden Landing Ecological Reserve and the South Bay Salt Ponds Restoration Project. The entirety of the site is surrounded by levees, with two breach points on the western levee that drain the site into the Whale's Tail South Fluke. A line of upland habitat islands run north-south down the center of the southern half of the site, staggered at even distances, and two similar but larger islands were created in the southern corners of the marsh.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Cargill Mitigation Marsh has, like the adjacent Whale's Tail Marshes, been treated for the last two years solely via backpack sprayer, and will continue to be treated in this way going forward. Treatment crews walk the marsh plain, treating all non-native *Spartina* present. Support for this work is provided via spray truck working along the peripheral levee system to the east.

Sub-Area 13g: Upstream of 20 Tide Gates

Conservancy Grant Recipient:

Alameda County Department of Public Works – Flood Control District

Site Responsible Entity:

Alameda County Department of Public Works-Flood Control District, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and Pest Control Supervisor*, (925) 803-7011, saul@acpwa.org

Site Description

The "20 Tide Gates" is a water control structure on Old Alameda Creek that spans the entire watercourse and is located at the upstream extent of sub-areas 13a, 13b, and 13c. sub-area 13g is a 30-acre area of the Old Alameda Creek channel that continues upstream

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

for approximately one-half mile north to a railroad grade at the edge of Union City. This morphology of this sub-area is similar to the other Old Alameda Creek sites, with two parallel channels and a central island. However, the salinity is much lower than the downstream areas, and a brackish vegetation assemblage dominates. The mid elevation areas are densely covered with alkali bulrush (*Bolboschoenus maritimus*) and some tule (*Schoenoplectus acutus*) and cattail (*Typha* sp.), with a pickleweed (*Sarcocornia pacifica*) understory on the margins and where this species is able to get enough sunlight to thrive.

Treatment Entity:

Alameda County Department of Public Works – Flood Control District

Spartina Species Present:

Spartina alterniflora x *foliosa*

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles

Treatment Approach:

The small area of marsh upstream of 20-tide gates was dredged in late 2010 and will likely contain very little habitat for non-native *Spartina* for at least the next few years. However, there have been small clonal patches in this area, and may be in the future. Any non-native *Spartina* found here will be treated via Argo as a first line of treatment, followed by backpack sprayer where necessary. Argo is the preferred method in this area because of the copious amounts of litter and debris that collect above the gates. This area is dangerous to ground-based personnel on foot.

Sub-Area 13h: North Creek

Conservancy Grant Recipient:

Alameda County Department of Public Works – Flood Control District

Site Responsible Entity:

Alameda County Department of Public Works-Flood Control District, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org*

Site Description

North Creek is a channel that was opened to tidal action in winter 2005 by excavating a 60-meter section of the levee along the north channel of Old Alameda Creek about 1.3 miles upstream of the mouth. North Creek was unsuitable habitat for *Spartina* until it was opened to tidal exchange from the north channel of Old Alameda Creek in late 2005, and

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

since that side of the creek was only partially treated in that first year, an abundance of hybrid *Spartina* seed was introduced to North Creek. Since that initial infestation, treatment has removed almost all of the non-native *Spartina* from the banks of this creek.

Treatment Entity:

Alameda County Department of Public Works – Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Truck
- Amphibious vehicles

Treatment Approach:

Treatment crews will work along the levees bordering the constructed channel, treating any patches of non-native *Spartina* found there. Either Argo or spraytruck are appropriate for this work.

Sub-Area 13i: Pond 10

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

Pond 10 is located in the northwest corner of Eden Landing on the north side of the mouth of Mt. Eden Creek, and south of the eastern landfall of the Hayward-SanMateo Bridge. To the west a levee separates this pond from the fringing marshes and mudflats of the Bay. Pond 10 was opened up to tidal action in summer 2004, and is maintained by CDFG as wading habitat for shorebirds, and as such, the site is constantly inundated. Non-native *Spartina* at this site has historically occurred only along the edges of the levees and constructed upland islands.

Treatment Entity:

Private contractor via competitive bid

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Treatment in Pond 10 involves personnel equipped with backpack sprayers walking the periphery of the pond and treating any non-native *Spartina* found there. This crew is supported as necessary by a spray truck moving along the levee system adjacent.

Sub-Area 13j: Mount Eden Creek

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

Mt. Eden Creek is a recently re-aligned tidal creek channel that runs roughly east-west to the south of Pond 10 and the Hayward-San Mateo Bridge in Eden Landing. The mouth of the channel grades with the northern portion of the Whale's Tail North marshland. Habitat along the channel consists of wide benches of tidal marsh habitat in places, a large, open mudflat currently uncolonized by tidal marsh species, and thin, levee-edge vegetation. Non-native *Spartina* can be found in all of these habitat types.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

Much like elsewhere in this complex, treatment crews will walk the channel edges and mudflats, treating via backpack sprayer all non-native *Spartina* found on the site. This work will be supported by a spray truck working along the levees that run on either side of the channel.

Sub-Area 13k: North Creek Marsh

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

North Creek Marsh is a marsh newly restored to tidal action at the northern end of the North Creek channel, to the southeast of Mount Eden Creek Marsh. The marsh was opened to tidal exchange in 2006, and has been colonized over much of its area by native tidal marsh vegetation. Since the non-native *Spartina* infestation in North Creek and Old Alameda Creek was still present at the time of opening, this marsh was infested from the outset. Yearly treatments at this site since 2008 have kept the infestation from expanding within this marsh. Small, remnant clonal patches are what remain of the infestation as of 2010.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Much like elsewhere in this complex, treatment crews will walk the marsh plain and mudflats, treating via backpack sprayer all non-native *Spartina* found on the site. This work will be supported by a spray truck working along the levees that run on east and west of the marsh.

Sub-Area 13l: Mount Eden Creek Marsh

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; *John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov*

Site Description

Mt. Eden Creek Marsh is a roughly 120 acre marsh that was opened to tidal action in the fall of 2008. The majority of the marsh is as yet un-vegetated, with a section of the northernmost portion supporting pickleweed. Much of the rest of the marsh is shallow mudflat. Non-native *Spartina* established a foot hold here in 2009, and full treatment of the colonizing infestation occurred in 2010.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Treatment crews will walk the marsh plain, treating all non-native *Spartina* found. Spray trucks will work along the peripheral levee system, re-supplying applicators when necessary.

South Bay Marshes

TSN: ISP-2004-15

Conservancy Grant Recipient:

USFWS (Site 15a) & California Wildlife Foundation (Sites 15a-15c)

Site Responsible Entities:

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeoundation.org.

US Fish and Wildlife Service, Don Edwards National Wildlife Refuge, 1 Marshland Road, Fremont, CA, 94605; Joy Albertson, (510) 792-0222 x 131, joy_albertson@fws.gov.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

City of Mountain View, Shoreline Regional Wildlife and Recreation Area, 3070 N. Shoreline Blvd., Mountain View, CA 94043; John Marchant, john.marchant@mountainview.gov

Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, CA 95118-3686; Lisa Porcella, (408) 265-2607 x 2741, lporecella@valleywater.org.

Site Complex Description

The areas covered in this site plan include the shoreline of the South Bay from Coyote Creek in the east, around the southern shoreline of the bay clockwise to Faber-Laumeister Marsh in East Palo Alto in the west. Within this large area are many marshland habitat types, including restored salt ponds, tidal sloughs, creek deltas, fringing tidal marsh benches, open mudflats, historic tidal marsh plains and other habitat types. In Santa Clara County alone, over 100 miles of undulating shoreline make up the complex area covered in this plan. Much of the area has been developed for light industrial uses, but there are also public parks and trails along portions of the shoreline. Within the City of Mountain View, the Shoreline Regional Wildlife and Recreation area includes the Shoreline Amphitheater where thousands of concertgoers attend events year-round. Some of the marshland areas are inaccessible to the public, like the areas around the mouth of Coyote Creek which are owned by the U.S. Fish and Wildlife Service as part of the San Francisco Bay Don Edwards National Wildlife Refuge.

The infestation of non-native *Spartina* in the South Bay is scattered amongst the sloughs, marshes and creeks of the entire shoreline. In the east, where Coyote Creek empties into the Bay, the infestation is very concentrated along the shoreline near the mouth, where new sediments have been deposited over the last few years. Small and large pioneering clonal patches are here interspersed within a matrix of native *Spartina*. Also in this area is the infestation around the Knapp Tract, a salt pond system that was breached in late 2010 to restore tidal exchange. This infestation has established within an existing native *Spartina foliosa* stand that lines the edges of the marsh. Here the morphologies of the hybrid *Spartina* present various characteristics intermediate to either of the parent plants. The area around the Knapp Tract represents the single largest concentration of non-native *Spartina* in this site.

Site 15a – South Bay Marshes

Site Description

The South Bay Marshes sub-area is located at the far southern tip of San Francisco Bay within Santa Clara County. The site stretches from the left bank of upper Coyote Creek in the east (the right bank is Site 5f in Alameda County) to Charleston Slough in the west and includes over 100 miles of shoreline and encompasses some 1,750 acres of marshland. This site is mostly composed of the thin fringe marshes between the levees and the banks of major sloughs and creeks that border current and former salt ponds, remnants of a vast network of diverse marshlands that existed here before salt production began. There are major sloughs and creeks encompassed in this sub-area including (from east to west) Coyote Creek, Alviso Slough, Guadalupe Slough, Stevens Creek,

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Permanente Creek, and Outer Charleston Slough. A great deal of wastewater input enters these channels from upstream municipalities such as the City of San Jose, and this has lowered the salinity and allowed brackish plant communities to establish a greater presence, especially in the upstream reaches of these channels. There is also a 1,800 meter-long accreted sediment island in the center of Coyote Creek at the mouth of Alviso Slough, and this has been colonized at varying rates by native marsh vegetation as well as hybrid *Spartina*. This site includes much of the South Bay Salt Ponds Restoration Project, which will convert thousands of acres of former salt evaporation ponds to various types of marsh and open water habitat over the next 50 years.

Treatment Entity:

USFWS & California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers
- Truck

Treatment Approach:

In 2010, Santa Clara Valley Water District (SCVWD) completed a 7-year stint managing the invasive *Spartina* within the borders of this site as a mitigation measure for their Stream Maintenance Program. While the Treatment Entity may change for this site, the Treatment Methods will largely remain the same with one important exception. Knapp Tract (Pond A6) was breached on December 3, 2010 which cuts off some of the levees that surrounded the site from ground traffic. An airboat will be used to treat these inaccessible areas on the north side of the pond just downstream from the mouth of Coyote Creek, and will be used in a few places where SCVWD previously relied on a shallow-bottom boat. The rest of the treatment work will be conducted in the same manner as it has been in the past. A truck with a spray rig will drive down the many miles of adjacent levee roads and either haul hose out to the infestation points or the applicators will don backpacks and walk out to the points from the levee. ISP will inventory this site ahead of treatment to maximize efficiency and will accompany the applicators with GPS to ensure thorough coverage.

Site 15b – Faber-Laumeister Marsh

Site Description

This site is composed of two contiguous marshes, Faber and Laumeister, located on the west San Francisco Bay shoreline in East Palo Alto, 1.5 miles south of the Dumbarton Bridge. Laumeister Marsh extends 780 m from its northern border on Bay Road at

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Cooley Landing to the levee that serves to divide the two marshes; Faber Marsh extends the remaining 600 m south to San Francisquito Creek from this border. This 210-acre complex of tidal marshlands is a relatively intact remnant patch of a much larger historical marshland community, and maintains a high level of species diversity and habitat complexity. The 600 m-wide marsh plains are riddled by a network of sinuous, higher-order channels lined with dense hedges of *Grindelia* on both banks. Many of the small channels are filled with native *Spartina foliosa*, which creates excellent California clapper rail foraging habitat and refugia. A PG&E boardwalk runs the length of the site along the bay shoreline and provides access to the eastern marsh edge and helps treatment or survey crews to cross the mouths of the numerous channels on the site. Faber-Laumeister is owned by the City of Palo Alto and managed by USFWS as part of the Refuge complex.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 15 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Faber Laumeister was first treated in 2009 after hybrid *Spartina alterniflora* was first found here by ISP late in 2008. The infestation was never heavy, but there were some large clones along the northern channel in Faber and there were small patches and pockets of hybrid spread over a good portion of the site. After two seasons of treatment, the infestation is under control and can be adequately managed using backpack sprayer. ISP personnel will guide the applicators around to the scattered infestation points using GPS units displaying the most current inventory data.

Site 15c – Shoreline Regional Park

Site Description

The 750-acre Shoreline Regional Wildlife and Recreation Area in the City of Mountain View includes Charleston Slough, Permanente Creek, and Stevens Creek, as well as restoration areas and remnant strips of bayfront tidal marsh habitat. The park complex includes two sites that have been infested by hybrid *Spartina*, Inner Charleston Slough and Stevens Creek Tidal Marsh. The bayfront infestation along this stretch of shoreline and up into the sloughs is part of Site 15a – South Bay Marshes.

Stevens Creek Tidal Marsh is a 30-acre restored marsh in the southeastern corner of the Recreation Area. It is bordered on all sides by levees topped with access roads that serve

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

as recreational trails, with tidal exchange entering on the northeast corner from a channel to Stevens Creek cut under the eastern road. The marsh is about 300m wide at the northern border and tapers over its 630m length to about 100m wide at the footbridge on the southern end. PG&E powerlines run up both sides of the marsh, their towers anchored on 35-45m spits of fill that jut out from the levee roads. The marsh is fully vegetated, with the northern portion containing well-established populations of native tidal marsh plant species including broad swaths of native *Spartina foliosa* on the marsh plain and extensive gumplant (*Grindelia stricta*) lining the channel banks. In the southern portion of the marsh, particularly below the footbridge, the lower salinity of this muted site has allowed brackish marsh species to establish and thrive, including dense stands of alkali bulrush (*Bolboschoenus maritimus*).

Inner Charleston Slough is a 90 acre formerly-diked salt evaporation pond on the western border of the Recreation Area that has been restored as a wet pond. It is surrounded by levees with a tide gate at the center of the northern levee that allows tidal exchange but separates the pond from the more intact tidal marsh habitat of outer Charleston Slough that extends 830m to its mouth on the bay. The marsh vegetation at the site consists of a thin margin around the pond primarily composed of pickleweed, extending from the toe of the levee to the water's edge. The levee on the western shore is topped with a wide access road that is highly used for recreation, whereas the eastern and northern levees are gated to protect the habitat from unauthorized human traffic.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 15 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Applicators with backpack sprayers will treat Stevens Creek Tidal Marsh using a nurse rig truck staged on the surrounding levee roads. The truck will follow the crew around the perimeter of the site to provide refilling and any additional support. The infestation is well-controlled at this site and the time commitment to treat it has dropped significantly each year. With fewer refilling trips back to the truck expected in the future, the work could be completed in a few hours in 2011.

The infestation at Inner Charleston Slough has almost been eradicated. It was never large, mainly composed of very cryptic hybrid plants that genetic testing deemed hybrid, and these were scattered sporadically over hundreds of meters of the thin pickleweed fringe.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

If treatment is warranted in the future it will be conducted by an applicator with a backpack sprayer.

Cooley Landing Salt Pond Restoration TSN:ISP-2005-16

Conservancy Grant Recipient:
California Wildlife Foundation

Site Responsible Entity:

StarLink Logistics, Inc. (SLLI) One Copley Parkway, Suite 309, Morrisville, NC 27560; *Mike Rafferty, SS Papadapulos & Associates, Inc., 116 New Montgomery St., Suite 9001, San Francisco, CA 94105-3629, (415) 896-9000, mrafferty@sspa.com*

Midpeninsula Regional Open Space District, 330 Distel Circle, Los Altos, CA 94022-1404; *Cindy Roessler, Resource Manager, (650) 691-1200, croessler@openspace.org.*

Site Description

Cooley Landing is a 165-acre salt marsh restoration site located at the northwestern point of the South San Francisco Bay Estuary, south of the Dumbarton Bridge and adjacent to the point where the Hetch-Hetchy Aqueduct makes landfall on the western shore at Menlo Park. The site is a former salt production evaporator pond that is undergoing restoration to tidal marsh. Initial restoration activities were completed between September and December of 2000, and included the excavation of two breaches through the east levee at locations of historic tidal channels. Re-vegetation of the former salt pond is expected to occur through natural colonization. Performance criteria for the restoration of Cooley Landing requires 70 percent cover of salt marsh vegetation and less than five percent cover of non-native vegetation by the tenth year following restoration. Cooley Landing is part of the Ravenswood Open Space Preserve.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Trucks
- Airboat
- Helicopter

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

Treatment at the Cooley Landing Salt Pond Restoration site is difficult because of the soft unconsolidated mud that underlies the majority of the marsh, and due to the presence of various open channels throughout the marsh. The scattered footprint of the infestation, combined with the presence of native *Spartina foliosa* requires that treatment crews access the interior portions of the marsh by various ground-based treatment methods for treatment specificity. Treatment has taken place over two consecutive days (2009 and 2010 seasons) and is likely to require the same time commitment going forward.

Crews access the western portion of the marsh with backpack sprayers using either the central PG&E boardwalk under the power lines that bisect the marsh, or via the peripheral levee system. These personnel directly treat each previously mapped invasive *Spartina* plant, and return to the boardwalk or levee (whichever is nearest or most accessible) to meet with the spray truck, airboat or amphibious vehicle for refilling. This occurs regularly throughout the treatment day.

Crews in spray trucks and amphibious vehicles use the levee system to maneuver around the marsh edge, treating all mapped plants within the radius of the hose reel equipment on board the vehicles. Treatment staff haul hose up to 300 feet from the vehicle, walking the marsh plain. Amphibious vehicles like the Argo 2-person tracked vehicle, or the MarshMaster tracked vehicle may also access central portions of the marsh. The advantage provided by these vehicles is lessened reliance on low-volume backpack work, which necessitates laborious refilling and travel time for crews, as well as decreasing the physical danger associated with the backpack work.

Airboat crews access the interior portions of the eastern marsh via the breaches in the eastern levee system. The airboat moves across the open mudflat areas and larger channels in this portion of the marsh, treating with hose reel spray equipment *Spartina* patches that are generally inaccessible to ground-based treatment personnel. The airboat is also indispensable in refilling backpackers and ferrying staff over channels where necessary.

Helicopter spray operations were not used in 2010 due to the use of the airboat. They were used in all previous years, however, and aerial treatment work would be warranted if the infestation at Cooley Landing were to expand significantly in any year. Treatment would be selective, treating only those portions of the marsh that prove the most difficult to access, or where large, contiguous stands of non-native *Spartina* would be treated more efficiently by air. Scattered, disparate clonal patches located in the marsh plain would not be likely to result in aerial treatment work in this marsh.

Alameda San Leandro Bay Complex TSN:ISP-2005-17

Complex Description

The area encompassed by this Site-Specific Plan includes all marshlands of the Alameda and San Leandro Bay Area extending from the western tip of Bayfarm Island and San

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Leandro Channel in the west, to east of Interstate 880 and the Oakland Coliseum in the east. The northern boundary of the site is the Port of Oakland shipping terminals, and the southern edge is 98th Ave on San Leandro Creek. This area supports many diverse habitat types despite the fact that it is directly adjacent to some of the most highly developed land on the West Coast. Within this area there are recently restored tidal marshes, freshwater ponds and upland islands, highly complex and diverse historic marsh habitats that include channels, high marsh, mudflats and pans, thin strip marshes along riprapped shoreline, public parks and trails, open mudflats, creek channels and mouths, sandy beach areas, marinas, private residences, commercial areas, industrial manufacturing facilities, shipping, and many other land use types.

Sub-Area 17a: Alameda Island South

Conservancy Grant Recipient:

City of Alameda

East Bay Regional Parks District

Site Responsible Entity:

City of Alameda, Department of Public Works Clean Water Program, 950 West Mall Square, Room 110, Alameda, CA 94501, *James Barse*, (510) 749-5857, *JBarse@ci.alameda.ca.us*.

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, *Fisheries Program Manager*, (510) 544-2342, *palexander@ebparks.org*.

Site Description

The Alameda Island South site includes several distinct areas within the stretch of southern Alameda Island, which runs from the west side of Encinal High School in the west to the Bayfarm Island Bridge in the east. Within this area is the shoreline of Encinal High itself, Ballena Bay, the shoreline adjacent to Paden Elementary School, Crab Cove, Robert Crown Memorial State Beach, the Elsie Roemer Bird Sanctuary, and a small portion of marsh that runs from High Street to the Bayfarm Island Bridge.

Crab Cove is an East Bay Regional Parks District site with a visitor center and other public park facilities. The area around the cove is restored beach with rip-rap edges to the west and around Ballena Bay. Small areas of marshland are establishing in lower energy areas of Ballena Bay and the Cove. Robert Crown Memorial State Beach is an EBRPD managed beach that runs from Crab Cove to the Elsie Roemer Bird Sanctuary in the east. The beach is maintained through yearly sand nourishment and limited grading. A thin upland edge above the beach is bordered by a paved recreational trail adjacent to Shoreline Drive.

Elsie Roemer Bird Sanctuary contains the largest single portion of marshland in this group of sub-areas and extends from a breakwater roughly at the southern end of Park

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Street, to between Court and High Streets in the east. The marsh is a mixed pickleweed and *Spartina* marsh with a thin fringe on the upper edge of higher marsh species. At the outer edge of the marsh, sandy mudflats extend south toward a deep channel near Bayfarm Island. The marsh has advanced out onto the mudflats with the assistance of the increased accretion rates provided by the expanding *Spartina* infestation over the last two decades, but the area was part of a more extensive historic marsh complex that once included much of Alameda Island as well as Bayfarm Island. This marsh currently contains several habitat types: a thin upper marsh pickleweed/*Grindelia* zone, a wide mixed *Spartina*/pickleweed zone, and open sandy mudflats. This site is home to the endangered California clapper rail as well as other marsh and shorebird species. The marsh is elongate and extends some 0.75 miles along the shoreline, bulging near the breakwater at the western portion and tapering to the east. The marsh at the Elsie Roemer Bird Sanctuary is a medium-sized marsh, at roughly 17.3 acres, along the southern shores of Alameda Island. The western portion of the marsh is managed by the East Bay Regional Parks District, and the eastern portion by the City of Alameda, though management of the *Spartina* control within the marsh has been done through the City of Alameda.

Treatment Entity:

Private contractor via competitive bidding
East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Truck
- Airboat

Treatment Approach:

The various areas included in this sub-area each require slightly different treatment approaches. Along the westernmost portion of the shoreline, those areas along Encinal High School, Ballena Bay and Crab Cove, can be treated either via backpack sprayer from the shoreline, or via airboat working in the shallow water and moving between sites. The airboat is an efficient way of treating the disparate clonal patches along the shoreline, and will be employed to the extent that the individual locations of non-native *Spartina* plants in the area remain numerous enough to justify the expense of deploying the airboat and crew. Once the infestations are significantly reduced, much of the area could be treated via backpack sprayer. However, the airboat may still be employed to move treatment crews between sites, rather than requiring treatment crews to navigate surface streets to access treatment areas on land.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

At Elsie Roemer, treatment crews will use backpack sprayers to treat all non-native *Spartina* left in the marsh plain. Support for this effort may come in the form of amphibious vehicles moving on the open sandy mudflats to the south of the vegetated marsh plain, or via trucks on the northern side of the marsh on the trails and/or roads adjacent to treatment areas. Amphibious vehicles will not be used within the vegetated marsh plain.

Sub-Area 17b: Bayfarm Island

Conservancy Grant Recipient:

City of Alameda

Site Responsible Entity:

City of Alameda, Department of Public Works Clean Water Program, 950 West Mall Square, Room 110, Alameda, CA 94501, *James Barse*, (510) 749-5857, *JBarse@ci.alameda.ca.us*.

Site Description

The Bayfarm Island sub-area includes the thin strip of marsh that extends along the northern shoreline of Bayfarm Island from the Bayfarm Island Bridge to roughly Aughinbaugh Way. This area has been measured at 8.75 acres and includes mixed pickleweed marsh of varying widths along its length. Beyond the bayward edge of the marsh, a short stretch of sandy mudflat extends to the dredged channel. The shoreline is lined with rip-rap and developed parkland, including a paved recreational trail along Seaview Parkway.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

The remaining non-native *Spartina* within this thin band of marsh will be treated via backpack sprayer, with support from a spray truck. Treatment crews will walk the marsh targeting all non-native *Spartina* found. The truck will be used for refilling as necessary.

Sub-Area 17c: Arrowhead Marsh

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander, Fisheries Program Manager, (510) 544-2342, palexander@ebparks.org.*

Site Description

Arrowhead Marsh is a roughly 47-acre marsh that forms the central part of the East Bay Regional Parks District's Martin Luther King Regional Shoreline in San Leandro Bay. This marsh represents a small remnant of a much more extensive historic marsh complex that once surrounded all of San Leandro Bay. Arrowhead Marsh contains a great diversity of habitat types, including marsh pans, small and medium sized channels, open mudflats, high and low pickleweed marsh, and an array of native marsh plant species and associations. It is also home to a population of the endangered California clapper rail, as well as other marsh and shorebird species. The clapper rail population, which increased markedly between 1998 and 2008¹, correlated with the domination of hybrid *Spartina* at the site, has declined considerably since the advent of effective *Spartina* control (See XXX for more details). The marsh is bordered by the waters of San Leandro Bay except on the south side, where paved recreational walkways, an interpretive center, a wooden boardwalk and open lawn form the hub of activities for the Martin Luther King Regional Shoreline.

Treatment in previous seasons has broken up the marsh into two areas, the east and west sides, and employed different strategies in each, resulting in differing conditions of the non-native *Spartina* infestation within each area.

On the east side of the marsh, treatment has been done predominantly via helicopter, with some follow-up work via airboat. Since 2007, treatment in the east side has been done utilizing a 'chemical mow' technique, wherein a dilute, sub-lethal solution of herbicide was used in the application. In this way, [it was hypothesized that](#) the plants would not continue to grow and produce seed, but would remain living in order to support the clapper rail. The resultant marsh is one of thick meadows of non-native *Spartina*, broken up by some open areas where the *Spartina* experienced greater mortality from the herbicide application than expected.

On the west side, treatment work was initiated in 2006 with a full-concentration application of herbicide via helicopter to reduce the *Spartina* meadow present there. This was followed with repeated full-strength herbicide treatment in subsequent years by personnel walking the marsh with backpacks, and crews hauling hose from the airboat to target the remnant patches in the marsh. The resultant condition of the east side of the marsh is one of scattered individual plants amongst a newly establishing native tidal marsh plant assemblage. In December 2010, the ISP assisted Save the Bay in planning

¹ East Bay Regional Parks District Winter High Tide Survey data, 1993-2010.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

and implementing native revegetation in this area to accelerate re-establishment of habitat structure to support clapper rails. This work included planting 500 *Grindelia* and *Triglochin maritima* plants along the tidal channels and distributed throughout the mid-marsh plain. No *Spartina foliosa* was planted because of the risk of pollination by the nearby hybrid population. The ISP will continue to coordinate with STB to monitor this project and to implement additional revegetation and other enhancement activities in 2011 and 2012.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Aerial: July 1 through end of treatment season

Ground/ Boat-based: August 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Airboat
- Helicopter

Treatment Approach:

Arrowhead East

The objective of treatment at this site in 2011-2015 will be full treatment for maximum mortality of remaining hybrid *Spartina*. In late July of the treatment season, aerial applications of imazapyr herbicide would be applied via helicopter equipped with boom spray arms to selected monocultural stands of *Spartina* on the eastern side of Arrowhead Marsh. Areas around channels or otherwise containing concentrated stands of desirable native plant species (especially *Grindelia* spp.) would be avoided.

By mid-August, the effects of the aerial treatment should be visible in the marsh as stunted or browned *Spartina*. Treated areas should readily contrast with adjacent untreated or missed stands that will remain green, vigorous and growing. At this time of year, untreated or missed plants will likely be bolting, showing a flower head or even flowers. At this time, treatment crews would access the marsh via airboat to treat all untreated *Spartina* plants found. Personnel will treat via hose reel spray equipment mounted on the airboat, either directly from the deck of the boat or by pulling hose through the marsh to target areas. Personnel would also be equipped with backpack sprayers to target smaller areas of remnant stands, or those areas that are out of reach of the airboat hose reel.

This treatment method would be used for the first season (2011) and likely the 2nd season (2012) under this site plan. The use of helicopter may not be necessary in year 2 if the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

biomass and distribution of the infestation is lessened enough that treatment work can be done most effectively via airboat and backpack. Chief amongst concerns is the need for specificity of treatment, so as to avoid unnecessary kill of non-target native plant species. In subsequent years, only backpack and airboat work should be necessary to comprehensively treat this portion of Arrowhead Marsh.

Arrowhead West

Previous treatment efforts on this portion of Arrowhead have reduced the infestation to very small levels of scattered re-sprouts and missed plants. The majority of the site is dominated by colonizing populations of native plant species. As has been done for the last two treatment seasons, the *Spartina* on the western side of Arrowhead will be treated via backpack and airboat, with treatment crews walking through the marsh plain targeting all non-native *Spartina* plants found. Since this methodology would be the same as in the east side of the marsh, the two portions of the marsh would be treated within the same time frame.

Sub-Area 17h: MLK New Marsh

Conservancy Grant Recipient:

East Bay Regional Parks

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander, Fisheries Program Manager, (510) 544-2342, palexander@ebparks.org.*

Site Description

The Martin Luther King Jr. Wetlands Project or MLK New Marsh is the marsh to the southeast of Arrowhead Marsh within the Martin Luther King Regional Shoreline. This marsh was opened to tidal action in 1998, and was designed to provide various habitat types including damped tidal, brackish and freshwater marsh. This plan only addresses the areas subject to tidal action, as the brackish and freshwater systems have not been infested with non-native *Spartina*. The marsh contains newly establishing vegetation throughout its roughly 34.1 acres, with pickleweed and *Spartina* dominating in most areas. Several constructed channels drain the center of the marsh to the north, and the outlet of the marsh is an armored channel that flows into the San Leandro Bay under a pedestrian walkway.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Timing:

Aerial: July 1 through end of treatment season

Ground: August 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Helicopter

Treatment Approach:

The central portion of MLK New Marsh may require aerial applications of imazapyr herbicide via boom-equipped helicopter during the 1st season of treatment under this plan (2011). As of 2010, the infestation in this area was fairly dense and uniform. Since this area was treated with a 'chemical mow', it is likely that this area will remain in this condition in 2011. In this case, aerial application will be the preferred option for treating the central portion of MLK New Marsh. If aerial applications are not used, concentrated efforts using truck-mounted hose reel equipment can provide a suitable alternative at greater cost and time.

It is unlikely that aerial applications will be necessary in subsequent treatment seasons as all of MLK New Marsh can be treated via truck-mounted spray equipment or backpacks. Applicators using these methods can access the marsh using the gates in the peripheral chain-link fencing, while the truck itself remains on the paved roads and pathways that border the marsh to the east and west, or on the uplands to the south. Backpacks can also be used to treat smaller plant locations throughout the marsh, using the truck as a refilling station.

Truck-mounted spray equipment and backpacks are likely to be the only treatment methods necessary past the 2011 treatment season.

Sub-Area 17e: San Leandro Creek

Conservancy Grant Recipient:

East Bay Regional Parks

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA

94605-0381; *Peter Alexander, Fisheries Program Manager, (510) 544-2342,*

palexander@ebparks.org.

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan, Weed and PestControl Supervisor, (925) 803-7011, saul@acpwa.org.*

Site Description

For the purposes of this plan, the San Leandro Creek Channel is only that portion of the creek that is downstream of the concrete-lined portion of the channel beginning just

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

upstream of 98th Avenue in Oakland. Along this stretch of creek there are several areas of marshland that have established within the creek channel, especially between 98th Avenue and Hegenberger Road. Downstream of Hegenberger, the channel banks become steeper, and the marsh fringe along the edges thinner. The area encompassed within the Site-Specific Plan for this subarea is estimated at 3.5 acres and includes only the thin marsh sections along the banks of the creek channel. San Leandro Creek Channel is known as Zone 13, Line P by ACDPW-FCD.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture
Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Amphibious vehicle
- Airboat/boat

Treatment Approach:

Upstream of Hegenberger Road, ACDPW-FCD will treat the shoreline of the channel using backpacks and the Argo amphibious vehicle with a spraytruck serving as support for treatment personnel. The Argo will traverse the edge of the marsh, spraying where larger stands remain, otherwise, especially when the infestation is reduced to small, scattered plants, backpack sprayers will be used.

Downstream of Hegenberger, EBRPD contracts with ACDAg to treat the edges of the channel using both spraytruck and backpack. Given the scattered condition of this infestation, backpack treatment will be the main treatment method along the Channel.

Sub-Area 17f: Oakland Inner Harbor

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

City of Alameda, Department of Public Works Clean Water Program, 950 West Mall Square, Room 110, Alameda, CA 94501, James Barse, (510) 749-5857, JBarse@ci.alameda.ca.us.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Port of Oakland, 530 Water Street, Oakland, CA 94607. *Carol Jones*, (510) 627-1132, cjones@portoakland.com.

City of Oakland, 250 Frank H. Ogawa Plaza, Suite 4314, Oakland, CA 94612. *Joel Peter*, Office of the City Administrator, (510) 238-7276. jmpeter@oaklandnet.com.

State Lands Commission, 100 Howe Ave Suite 100 South, Sacramento, CA 95825-8202, *Dave Plummer*, Regional Manager, (916) 574-1900. plummed@slc.ca.gov.

Site Description

The Oakland Inner Harbor sub-area consists of all the small areas of marsh within the Oakland Inner Harbor or Oakland Estuary, including lands along the City of Alameda northeastern shoreline as well as lands along the shoreline of the City of Oakland. This heavily developed area includes commercial, industrial, and residential properties, marinas, parks and many other facilities lining the shoreline. There are areas that include docks, piers, landings, sea walls, open shoreline, rip-rap, and other structures. The tiny marsh areas in the Inner Harbor are scattered and contain very little plant or animal diversity.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Airboat/boat

Treatment Approach:

Given the geographic scope of the locations of non-native *Spartina* plants in the Inner Harbor, the most efficient treatment method is via airboat working within the channel and moving between sites. Some areas are sprayed directly from the airboat via the spray hose equipment mounted onboard, and some is treated via backpack deployed from the boat. Other areas along the shoreline, especially along the Alameda shoreline within Alameda Point, require the use of the spraytruck. Other small areas along both the Alameda and Oakland shorelines cannot be accessed by the water, and are treated via backpack from the landward side.

Sub-Area 17g: Coast Guard Island

Conservancy Grant Recipient:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

California Wildlife Foundation

Site Responsible Entity:

United States Coast Guard, William A. Robinson, Chief, ISC Environmental Branch, US Coast Guard, Coast Guard Island, Alameda, California, 94501-0000, (510) 437-5775, William.A.Robinson@uscg.mil

Site Description

The Coast Guard Island site consists entirely of thin fringing marsh bordered by the rip-rap fill that surrounds Coast Guard Island within the Oakland Inner Harbor. The marshes surrounding this island have accreted sediment sufficient to support a thin band of mixed pickleweed/*Spartina* marsh. Beyond this vegetated fringe, the limited mudflats and open water of the Harbor connects this site with the San Francisco Bay. The island itself is mostly reclaimed land, with significant amounts of debris littering the mudflats, and the shallow waters surrounding the island include many sunken ship hulls.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Treatment around the island involves the use of truck-mounted spray equipment to target non-native *Spartina* plants directly. Where the infestation consists of scattered, smaller plants, backpack sprayers will be used.

Sub-Area 17h: MLK New Marsh

Conservancy Grant Recipient:

East Bay Regional Parks

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; Peter Alexander, Fisheries Program Manager, (510) 544-2342, palexander@ebparks.org.

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The Martin Luther King Jr. Wetlands Project or MLK New Marsh is the marsh to the southeast of Arrowhead Marsh within the Martin Luther King Regional Shoreline. This marsh was opened to tidal action in 1998, and was designed to provide various habitat types including damped tidal, brackish and freshwater marsh. This plan only addresses the areas subject to tidal action, as the brackish and freshwater systems have not been infested with non-native *Spartina*. The marsh contains newly establishing vegetation throughout its roughly 34.1 acres, with pickleweed and *Spartina* dominating in most areas. Several constructed channels drain the center of the marsh to the north, and the outlet of the marsh is an armored channel that flows into the San Leandro Bay under a pedestrian walkway.

Save the Bay has been working for several years to introduce native tidal marsh plants to the upland periphery of MLK New Marsh to provide habitat for California clapper rail and other species. Most of the native vegetation in this zone is the result of this effort. This work is anticipated to continue as the non-native *Spartina* is removed from the site, and the ISP, EBRPD and Save the Bay coordinate restoration activities in the area.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

Aerial: July 1 through end of treatment season
Ground: August 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Helicopter

Treatment Approach:

The central portion of MLK New Marsh may require aerial applications of imazapyr herbicide via boom-equipped helicopter during the 1st season of treatment under this plan (2011). This is due to the relatively dense infestation there as a result of chemical mow of the area in 2010. It is unlikely that aerial applications will be necessary in subsequent treatment seasons as all of MLK New Marsh can be treated via truck-mounted spray equipment or backpacks. Applicators using these methods can access the marsh using the gates in the peripheral chain-link fencing, while the truck itself remains on the paved roads and pathways that border the marsh to the east and west, or on the uplands to the south. Backpacks can also be used to treat smaller plant locations throughout the marsh, using the truck as a refilling station.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Truck-mounted spray equipment and backpacks are likely to be the only treatment methods necessary past the 2011 treatment season.

Sub-Area 17i: Coliseum Channels

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

The Coliseum Channels sub-area includes the upper portions of the flood control channels that drain into San Leandro Bay, except San Leandro Creek proper which is discussed as part of sub-area 17e. To differentiate them from the downstream mouths of the channels, the western boundary of these areas is defined as Interstate 880, which runs perpendicular to these channels and west of the Oakland Coliseum. The eastern end can variously be defined as that point where these channels are no longer above ground (culverted or buried), or where tidal marsh plant species are no longer present. These channels are typically steep-sided and degraded, often choked with sediment and copious litter from Coliseum events, and overgrown along their edges with weedy upland species.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Amphibious vehicle
-

Treatment Approach:

These channels are treated via backpack and Argo amphibious vehicle, with support from a spray truck working along the access roads and parking lots that are adjacent to the channel banks. Crews work directly in the channels with the Argo, driving in the channel bed (rather than the vegetated channel edge) where possible. Argo treatment is preferable in these areas as they are typically strewn with large amounts of litter and garbage presenting an unsafe working environment for applicators working with backpacks on the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

ground. However, where conditions allow for safe treatment work via backpack, this method will be used.

Sub-Area 17j: Fan Marsh

Conservancy Grant Recipient:
California Wildlife Foundation

Site Responsible Entity:
Port of Oakland, 530 Water Street, Oakland, CA 94607. Carol Jones, (510) 627-1132, cjones@portoakland.com

Site Description
Fan Marsh is a roughly 11-acre marsh located along on the interior of Doolittle Drive at Earhart Road in Alameda. The property is owned by the Port of Oakland and consists of high marsh pickleweed/*Spartina* interspersed with several small channels draining to the Bay to the east of Doolittle Pond.

Treatment Entity:
Private contractor via competitive biddgin

***Spartina* Species Present:**
Spartina alterniflora x foliosa

Treatment Timing:
July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:
Fan Marsh is easily accessible from all sides, and will be treated by several backpack sprayer-equipped personnel walking the marsh and targeting all non-native *Spartina* plants there. This work will be augmented by spray truck where the infestation remains larger, or dense stands persist. The spray truck will also be used to refill backpacks during work.

Sub-Area 17k: Airport Channel

Conservancy Grant Recipient:
East Bay Regional Parks District

Site Responsible Entity:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander, Fisheries Program Manager, (510) 544-2342, palexander@ebparks.org.*

Site Description

Also part of the MLK Jr. Regional Shoreline, the Airport Channel sub-area consists of the fringing marshes of the portion of Shoreline west of Arrowhead Marsh. The scattered patches of marsh that line the rip-rap edges of this area, especially along the eastern edge of Doolittle Drive, represent a thin marsh habitat that serves to connect the larger areas of Arrowhead Marsh in the east to Elsie Roemer and Crown Beach in the west. Within this area are an estimated 20 acres of mixed *Spartina*/pickleweed mid and low marsh habitat, as well as public recreational facilities including a boat launch, MLK Shoreline Center, fishing piers, shoreline trail, public beach, picnic and barbeque areas and a memorial grove.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Airboat
- Truck

Treatment Approach:

Treatment along the edge of the channel will be done via backpack and truck mounted spray equipment over the majority of the shoreline. Crews will walk the marsh edge treating all non-native *Spartina* plants there. The airboat will be used, as necessary, to augment these efforts where plants were missed earlier in the season, or where plants along the lower edge of the marsh cannot be accessed from the landward side.

Sub-Area 17l: Doolittle Pond

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander, Fisheries Program Manager, (510) 544-2342, palexander@ebparks.org.*

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Description

Doolittle Pond represents the westernmost end of the Martin Luther King Regional Shoreline. It is a squareshaped, formerly-diked area which has been breached in at least two locations to open the pond to tidal influence. The overall acreage of the pond is estimated at 15.1 acres, including the interior portions. Around the interior rim of the pond, where the remnant levees now support unpaved trails, a thin, patchy band of salt marsh habitat has developed amongst the rip-rap edge. Doolittle Pond borders Doolittle Drive to the south and is adjacent to a former landfill to the west.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Airboat
- Truck

Treatment Approach:

Treatment in Doolittle pond involves the use of backpack sprayers and/or truck-mounted spray equipment along the landward side near Doolittle Drive. The airboat is used on the outer edge of the marsh, at a medium to high tide. If the plants on the outer edges of the marsh can be treated via backpack at low tide, that technique will be used there as well.

Sub-Area 17m: Alameda Island East

Conservancy Grant Recipient:

City of Alameda

Site Responsible Entity:

City of Alameda, Department of Public Works Clean Water Program, 950 West Mall Square, Room 110, Alameda, CA 94501, *James Barse*, (510) 749-5857, *JBarse@ci.alameda.ca.us*.

Site Description

Alameda Island East represents an amalgam of small, patchy mixed marsh areas interspersed amongst the mostly residential development of the Alameda shoreline. Estimated at 7.5 acres, this area extends from the Bayfarm Island Bridge in the west,

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

along the shoreline of Alameda to the northeast, roughly to where the Oakland Inner Harbor (sub-area 17f) begins. Within this area are private docks and residences, schools, marinas and other facilities.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck
- Airboat

Treatment Approach:

Along the shoreline east of the Bayfarm Island Bridge, trucks, backpacks and the airboat will be used to move in and around the docks, fences and seawalls that define the water's edge along this stretch of Alameda Island. Some areas are accessible for backpack work, and present a sufficiently reduced infestation for this treatment method. Where significant stands still exist that can be accessed from land, truck-mounted spray equipment may be used. The airboat will be used to target areas in and around docks along the shoreline on the easternmost portion of this sub-area. Access to these areas via land is extremely difficult and time consuming.

Colma Creek & San Bruno Marsh Complex

TSN: ISP-2005-18

Conservancy Grant Recipient:

San Mateo County Mosquito and Vector Control District

Site Responsible Entities:

San Mateo County Mosquito Abatement District, 1351 Rollins Road, Burlingame, CA 94010; *James Counts, Field Operations Director*, (650) 344-8592. james@smcmad.org.

San Mateo County Flood Control District, 555 County Center, 5th Floor, Redwood City, CA 94063-1665, *Carole Foster*, (650) 599-1219, cfoster@co.sanmateo.ca.us

State Lands Commission, 100 Howe Ave Suite 100 South, Sacramento, CA 95825-8202, *Dave Plummer, Regional Manager*, (916) 574-1900. plummed@slc.ca.gov.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Complex Description

The Colma Creek – San Bruno Marsh complex contains an estimated 100 acres of marshland located along the western shores of the bay in the City of South San Francisco southeast of San Bruno Mountain State and County Park and immediately north of San Francisco International Airport. This area was once a thriving marsh complex referred to as Belle Air Island, but it has undergone massive filling and hydrologic alteration as well as decades of industrial land use and, more recently, corporate park development for the biotech industry. The northeast corner of the complex is located at the tip of San Bruno Marsh just south of Point San Bruno at the base of the hill on which the Blue Line Transfer Station sits adjacent to a section of the Bay Trail. Within this San Bruno Canal area, the Site 18 complex of eight sub-areas includes San Bruno Marsh, the fringe marsh around SamTrans peninsula, Confluence Marsh, Inner Harbor and Old Marina areas, and the three channels Colma Creek, Navigable Slough and San Bruno Creek. Most of the complex is located east of Hwy. 101, although all three channels begin on the western side of this thoroughfare. Within this area there are broad marshlands fringing the industrial fill of South San Francisco, strips of channel bank tidal marsh habitat, expansive open mudflats, mid-elevation pickleweed (*Sarcocornia pacifica*) marsh plains, brackish upper creek channels and other tidal marsh systems.

Site 18a – Colma Creek

Site Description

The Colma Creek site begins at Linden Avenue in South San Francisco just upstream of Hwy. 101 and runs 1.8 km down to the mouth of the creek, bordered here by the upper edge of San Bruno Marsh (Site 18g) to the north and on the south side by the triangular Confluence Marsh (Site 18f). The creek has been straightened and channelized between parallel levees topped with maintenance roads or trails, with two strategically placed bends in the watercourse to reduce the power of flowing stormwater. The upstream banks of the channel are heavily vegetated with invasive *Spartina* below the levees, and the downstream reaches have accreted large amounts of sediment creating areas for fringing marshland composed of pickleweed and *Spartina* to develop on top of these accreted marsh benches. Downstream of the footbridge at the confluence of Colma Creek and Navigable Slough (Site 18b), the marshland habitat along the creek is confined to the northern shore, and the southern shore is concrete lined. The marsh edge drops off sharply to the channel, with stretches of overhanging vegetative mats.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicles

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayers
- Truck

Treatment Approach:

The monoculture of hybrid *S. alterniflora* that used to line both banks of Colma Creek has been eliminated leaving scattered patches and individual stems of invasive cordgrass to contend with. Even with a very low cover class (e.g. <1% or 1-4%), the total amount of cordgrass remaining over this long channel has necessitated the use of an Argo that can transport the applicator and a tank that is sufficient to need limited refilling from a nurse rig. There are few access points along the west side of the creek for the nurse rig to stage, and refilling backpacks would still happen fairly regularly at this stage in the infestation. Therefore an Argo will still be used to drive along the transition zone above the marsh vegetation on the west side of the channel, spraying from the vehicle when a plant is found or hauling hose from it to treat a discrete area. On the east side there are long stretches where we could use a truck and hose to limit the disturbance from the Argo and allow native marsh vegetation to establish in place of the invasive *Spartina*. As the eradication progresses, the method will shift to a team of applicators walking the banks with backpacks. This will help to preserve the new marsh vegetation that is colonizing the old monoculture and providing habitat and flood control services.

Site 18b – Navigable Slough

Site Description

Navigable Slough runs 930 m from the confluence with Colma Creek just upstream of the pedestrian footbridge used by the Bay Trail to a point 100 m east of San Mateo Ave. on the west side of Highway 101 in South San Francisco. This channel is no longer navigable as its name may suggest because it has accreted so much sediment and has obviously not been dredged in some time. The marsh benches below the banks are very wide after years of accretion, and are composed of pickleweed and remnants of pre-treatment invasive *Spartina* meadows, dropping off sharply at the narrow channel edge. The channel is lined with levees that are topped with the Bay Trail on the south bank. This site also includes a small pocket of marsh on the south bank of Colma Creek immediately downstream of the footbridge. This wedge of marsh borders the water treatment plant for South San Francisco, and marks the point where marsh vegetation stops on the south bank and is replaced by concrete. The surrounding area is heavily developed with a combination of commercial and light industrial land use.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x *foliosa*

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Amphibious vehicles
- Backpack sprayers

Treatment Approach:

This sub-area is similar to Colma Creek (18a) in that it contained a monoculture of hybrid *S. alterniflora* that used to line both banks of the channel; it has been eliminated leaving scattered patches and individual stems of invasive cordgrass to contend with. This site also contains areas of very soft mud and unconsolidated substrate that is very hard if not impossible to walk on with a backpack. An Argo will be used to drive along the transition zone above the marsh vegetation as well as down onto the soft mud found at lower elevation, spraying from the vehicle when a plant is found or hauling hose from it to treat a discrete area. As the eradication progresses to the point where the invasive *Spartina* has been eliminated from the soft mud, and a low pressure delivery system is able to reach all the plants that need treatment, the method will shift to a team of applicators walking the banks with backpacks. This will help to preserve any new marsh vegetation that is colonizing the old monoculture and providing habitat and flood control services.

Site 18c – Old Shipyard (formerly Old Marina)

Site Description

The Old Shipyard (formerly Old Marina) site is actually a decommissioned shipyard area that is bordered to the south by the mouth of San Bruno Creek and the North Access Road to the San Francisco International Airport, with the water treatment plant for South San Francisco on the north side. This shipyard was used to build large concrete barges for World War II, and the old docks consist of five fingers of fill, three of which are now topped with asphalt and serve as airport parking lots, with the southernmost providing an access point to the Bay Trail and a footbridge over San Bruno Creek. A great deal of sediment has accreted in the 40 m-wide, 135 m-long berths between the five docks after they were no longer used for shipbuilding, and these spaces now support marsh vegetation and mudflat. The northernmost, bordered by the water treatment plant to the north, has the most developed mixed marsh vegetation component. The next berth to the south is closed by a concrete wall at its mouth that maintains open water even at low tide, with only a thin fringe of mixed marsh vegetation on the edges. The three remaining berths are mostly mudflat with a thin margin of marsh vegetation around the perimeter. The Old Shipyard is bordered to the east by the Inner Harbor (Site 18d).

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayers
- Trucks

Treatment Approach:

Several of the ship berths just have a minimal amount of invasive cordgrass remaining, but the northernmost one still had quite a bit in 2010 because of incomplete treatment in the past. The sturdy concrete walls around the old ship berths at this site provide an effective platform to stage a truck for treatment. The applicators can spray down onto the *Spartina* or can haul hose down from the spray rig to walk around and catch each plant. Backpack sprayers can either be used as the primary method or could supplement the truck work in areas where it would be less efficient to haul hose. Most of the ship berths open onto Inner Harbor (18d), so we may also treat the *Spartina* at the mouths of the berths by airboat while treating this contiguous site.

Site 18d – Inner Harbor

Site Description

The Inner Harbor sub-area of the Colma Creek and San Bruno Marsh Complex represents a rectangular area that provided access to the Old Shipyard (Site 18c) bordering it to the west and is sheltered by the fill of the SanTrans peninsula (Site 18e) to the east. To the north of the site is the South San Francisco water treatment plant and Confluence Marsh (Site 18f), while the southern border of the site is the North Access Road to San Francisco International Airport. The mouth of San Bruno Creek (Site 18h) is located in the southwest corner of the Inner Harbor. The area was composed largely of low elevation mudflats before colonization by invasive *Spartina*. Some of the fringing areas below levees and rip-rap have a thin mixed marsh vegetation component, mostly pickleweed.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles

Treatment Approach:

The Inner Harbor has been challenging to treat because it is comprised almost entirely by very soft mud that is not consolidated enough to even drive an Argo on but is at a high enough elevation to be a great site for hybrid *S. alterniflora* to flourish. Treatment by helicopter broadcast application has been effective at knocking this infestation down to a size where spot application is appropriate. Unfortunately, there are few herbicide delivery

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

systems appropriate for the job, especially to conduct the work on an appropriate tidal cycle for sufficient dry time. In 2011, SMCMVCD will have an airboat for *Spartina* treatment season, and this will be the primary method used at the Inner Harbor site. The edges of this site have a firmer substrate that will accept the ground pressure of an Argo, so this equipment will probably be deployed as support for the airboat operations. However it may be possible to simply deploy personnel from the airboat with the powersprayer and haul hose around to plants on the edge.

Site 18e – SamTrans Peninsula

Site Description

The SamTrans Peninsula site is a roughly diamond-shaped area where the marsh was filled and covered with asphalt for this county public transportation agency to store and maintain their buses. To the south it is connected to the North Access Road for San Francisco International Airport by a thin strip of paved fill. The Inner Harbor (Site 18d) borders SamTrans Peninsula to the west, with Confluence Marsh (Site 18f) to the northwest on the other side of the narrow channel that connects Inner Harbor to the outer bay. The entire peninsula has a fringe mixed marsh edge at the toe of the rip-rap that is composed of pickleweed, *Spartina*, and alkali heath (*Frankenia salina*) and is wider on the eastern outboard side. This site also includes the larger marsh section to the east of the base of the peninsula that extends approximately 500 meters along the mainland shoreline out to the open bay. The latter marsh area is more diverse than the narrow fringe marsh at the base of the rip-rap levees, and is as much as 100 m wide where it meets the peninsula.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers
- Truck

Treatment Approach:

The treatment area around the peninsula itself is easily accessible from the mostly paved trail around the edge of the polygon. This enables a truck to move along the trail while an applicator hauls hose down into the marsh vegetation to treat the hybrid *Spartina*. The site can also be walked with backpacks if the pre-treatment inventory indicates good efficacy from 2010, and the nurse rig could be close by if they needed to refill a couple of times. In the eastern portion of the site, the marsh is wide enough to justify the use of

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Argo if the infestation is persistent and a relatively high percent cover remains in 2011. The lower elevation patches could be hit by the airboat since it will be deployed to treat some of the neighboring sites in this complex.

Site 18f – Confluence Marsh

Site Description

Confluence Marsh consists of a fragmented seven-acre area of marshland that forms an arrowhead shape between the mouths of Colma Creek and San Bruno Creek. SamTrans Peninsula (Site 18e) sits across the San Bruno Creek mouth channel to the southeast, and San Bruno Marsh (Site 18g) is located across the Colma Creek mouth to the north. Confluence Marsh sits in the center of this site complex, jutting out towards the open bay from the peninsula that contains the City of South San Francisco water treatment plant. The marsh tapers to a narrow fringe as it extends back southwest into the Inner Harbor (Site 18d) towards the Old Shipyard (Site 18c). It is composed of a relatively intact mid-elevation pickleweed and *Spartina* marsh, with several large patches of open mudflat remaining uncolonized by marsh vegetation.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack

Treatment Approach:

In 2010, the persistent portion of this infestation was concentrated at low marsh elevation, particularly at the tip of the polygon. These areas would be appropriate for airboat application, most of which could be conducted directly from the deck of the craft. Depending on other factors, we could either deploy personnel onto the marsh with backpacks to treat the remaining scattered patches, or the applicators could walk down into the marsh from the upland edge of the water treatment plant.

Site 18g – San Bruno Marsh

Site Description

San Bruno Marsh is a 35-acre area on West San Francisco Bay that serves as the northern border of San Bruno Canal and this ISP site complex. Over the years, invasive *Spartina* has created this low-elevation marsh on the open mudflats that begin on the north side of the mouth of Colma Creek (Site 18a) and continue north and east approximately 1.2 km along the South San Francisco shoreline that is home to corporate parks and the Blue

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Line Transfer Station built on fill high above the bay. A segment of the Bay Trail runs along the short upland transition zone of this entire site. Just east of the confluence of Colma Creek and San Bruno Creek (Site 18h) is a 0.65-acre island included in the site that supported mostly invasive *Spartina* pre-treatment, but also contains some clusters of gumplant (*Grindelia stricta*) and pickleweed on a higher elevation point near the center. San Bruno Marsh does not have an extensive network of channels since it has developed only recently on sediment accreted by hybrid *Spartina*.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers
- Truck

Treatment Approach:

The huge meadow of hybrid *S. alterniflora* that existed at this site a few years ago is long gone. It has been replaced by a patchwork of hybrid patches, some areas colonized by pickleweed as well as those pickleweed stands released from competition with *Spartina* as a result of the control efforts, and areas of open mud which was the natural condition of the majority of this site before the invasive cordgrass transformed it and raised it up near marsh elevation. In 2011, the airboat will be used to treat all of the outboard clones and any new plants, improving efficiency and most likely increasing efficacy over using an Argo in this somewhat unconsolidated substrate. Argos will be used for the middle and upper elevations. As the eradication progresses, backpacks will be deployed to treat scattered patches and an applicator can haul hose out to larger patches from a truck staged on the paved path.

Site 18h – San Bruno Creek

Site Description

San Bruno Creek is a channelized tidal system that constitutes the southwest corner of this site complex. The site begins just west of Hwy. 101 and east of 7th Ave. in an area of unincorporated San Mateo County called 7th Avenue Park sandwiched between the northeast corner of the City of San Bruno and San Francisco International Airport. The channel vegetation is composed of mostly freshwater species for the first 200 meters until it flows under San Bruno Ave. and begins to take on a more brackish character. The creek flows north under Hwy. 101 and a cluster of onramps, then turns east and flows 700 m along North Access Road, through tide gates, and out to the rectangular Inner Harbor area

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

(Site 18d) bordered by the Old Shipyard (Site 18c) to the west and SamTrans Peninsula (Site 18e) to the east. The mouth of San Bruno Creek is actually in the northeast corner of the Inner Harbor, where it flows between Confluence Marsh (Site 18f) and SamTrans Peninsula and joins Colma Creek (18a). Both banks of the creek contain a fringe marsh component along their length.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

This site is similar to Colma Creek (18a) and Navigable Slough (18b) in that it was a channel lined on both sides (and overarching) with hybrid *S. alterniflora* a few years ago. Initial treatment here was effective, but an upstream population went undetected for a few seasons and prolonged the eradication efforts downstream. There is also a somewhat small patch of hybrid *Spartina* at the upstream extent up in Cupid's Bow where a population of the red-legged frog (*Rana draytonii*) still exists surrounded by intense development. The presence of this endangered species precludes herbicide use. The managers of this site mow the channel where the *Spartina* is located each year to improve frog and snake habitat, and this has kept the hybrid *Spartina* in check in this section.

This site is walked by applicators with backpack sprayers. The infestation is very sparse and scattered, and the distance is more manageable than the channels of Colma Creek or Navigable Slough. A truck could be helpful to treat some of the large stands by powersprayer from atop the adjacent levee, and having a tank nearby will help with refilling the backpacks without a loss of efficiency.

West San Francisco Bay Complex

TSN: ISP-2005-19

Conservancy Grant Recipient:

San Mateo County Mosquito and Vector Control District

Site Responsible Entities:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

San Mateo County Mosquito Abatement District, 1351 Rollins Road, Burlingame, CA 94010; *James Counts*, *Field Operations Director*, (650) 344-8592. james@smcmad.org.

Site Complex Description

This site complex includes all tidally influenced areas of the western San Francisco Bay in San Mateo County from the county line near Candlestick Point in the north to just south of the San Mateo-Hayward Bridge. This stretch of shoreline is highly developed, including several small marinas, tidal lagoons, numerous flood control channels, small fragmented patches of remnant marsh, and the mouths of several creeks and sloughs. A wide range of land uses can be found here, ranging from San Francisco International Airport to light and heavy industry, to both commercial and residential development. There are large mudflat areas, little nooks of *S. foliosa* and pickleweed (*Sarcocornia pacifica*), and many kilometers of armored shoreline both on the bayfront as well as surrounding the lagoons further inland. The infestations throughout Site 19 are all composed of hybrid *S. alterniflora*, but Sanchez Marsh and Burlingame Lagoon also contain *S. densiflora* that was planted at some point by a well-meaning restorationist, and another planting of *S. densiflora* was discovered in 2010 in Redwood City and has been added as Site 19s.

SMCMVCD field crews generally consisted of two to four people applying herbicide from Argos, with one person loading material and cleaning mud from paved trails in public areas. Each Argo was equipped with a 25-gallon tank and hand gun sprayer. Pick-up trucks with 50-gallon tanks were employed to transport the Argos to and from the site and carry extra material. The Argos were re-supplied in the field from a trailer (nurse rig) carrying 400 gallons of water and equipped with a gas pump to transfer material to the tanks on the Argos. A great deal of work is also conducted by truck and backpack sprayer now that the infestations have been reduced over several years of treatment.

Site 19a – Brisbane Lagoon

Site Description

Brisbane Lagoon is a 120-acre triangular lagoon in the City of Brisbane that tapers to a point at its southern end. The lagoon is bordered to the west by Caltrain railroad tracks and Bayshore Boulevard, to the east by Sierra Point Parkway and the Bayshore Freeway (Hwy. 101), and to the north by Lagoon Way and the area of the Lagoon Holding Pond. The northwest corner of the lagoon is spanned by the Tunnel Avenue Bridge and contains roughly two acres of marsh habitat. The western shore of the lagoon is mostly rip-rap adjacent to the CalTrain tracks, with a small (roughly 0.5 acre) bulb of marsh centered at the midpoint. The southern tip of the lagoon contains a shell beach fronting approximately 7.5 acres of pickleweed (*Sarcocornia pacifica*) marshland. The eastern side of the marsh consists mostly of rip-rap adjacent to Sierra Point Parkway interspersed with small marsh areas and car pull outs. The main central portion of the lagoon is open water even at low tide. Included in this site is a manmade tidal channel north of the Lagoon Holding Pond that runs more than 700 m from the bay to a pump house just west of Tunnel Avenue. For ISP purposes, the shoreline of the bay on the east side of Hwy 101 from Candlestick down to Sierra Point is also included in this sub-area.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicles
- Backpack sprayers
- Truck

Treatment Approach:

A combination of treatment methods are required to complete the work at Brisbane Lagoon due to widely-varying site characteristics and the need for sensitivity in certain habitats. Argos will only be used on the western edge along the base of the railroad grade. The northern and eastern edges will be treated by truck and hose, and applicators with backpack sprayers will walk the southern marsh to reduce potential impacts to the habitat. A truck will also be used to treat the shoreline east of Hwy 101. The manmade tidal channel described above cannot be treated by Argo because the area is riddled with rebar; therefore, backpack sprayers will walk the length of this channel and treat what they find.

Site 19b – Sierra Point

Site Description

This four-acre site occupies the northwestern corner of the square-shaped peninsula of Sierra Point in the City of Brisbane. It is bordered to the south and west by the northbound onramp for the Bayshore Freeway (Hwy. 101), to the east by a vacant lot and corporate park development along Marina Boulevard, and to the north by San Francisco Bay. The area consists of a narrow channel flowing down the center of the site lined with pickleweed benches, transitioning quickly in the upstream extent to brackish marsh plants such as alkali bulrush (*Bolboschoenus maritimus*). At the mouth of the channel are extensive mudflats that were heavily infested with hybrid *Spartina* when treatment began here in 2006.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayers
- Truck

Treatment Approach:

The mouth of the tiny creek that empties to the bay at the Sierra Point site was clogged with hybrid *Spartina* just a few years ago, with clones also stretching far out onto the mudflats. Only remnants of that infestation still exist today, but there is still a bit of work before the site is eradicated. A truck can stage on the trail just south of the cove which will allow the applicators to use a powersprayer for some of the larger clones. These efforts will be supported by backpack sprayers in the upper reaches of the creek where the infestation is very minor and spotty, and can also assist at the bayfront for clones beyond reach of the hose. Any hybrid found along the shoreline adjacent to the Sierra Point Marina will also fall to the backpack sprayer.

Site 19c – Oyster Cove

Site Description

The Oyster Cove site is located at the northern city limit of South San Francisco. It is bordered to the west by Caltrain railroad tracks and the Bayshore Freeway (Hwy. 101), to the north by office buildings on Shoreline Court, to the south by a large corporate park on Oyster Point Boulevard, and to the east by the small Oyster Cove Marina on the Oyster Point peninsula. There is a two-acre pickleweed and *S. foliosa* marsh on the southwest side of the small cove that the marina occupies, and the native marsh vegetation stretches out into the main cove to the west. Most of the remainder of this area is rip-rap or concrete-lined shoreline adjacent to office parks and large hotels.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x *foliosa*
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Trucks

Treatment Approach:

A truck and hose will be used to treat any hybrid *Spartina* scattered along the shoreline of this site. There is a paved trail the entire length of the site that makes access simple. The applicator will also haul hose out into the small marsh fragment south of the marina if any hybrid is detected there.

Site 19d – Oyster Point Marina

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

This site is located on the eastern end of Oyster Point in South San Francisco, just north of Marina Blvd., approximately one mile east of Hwy. 101. The tip of the peninsula to the north is the site of a corporate park located at the end of Oyster Point Rd. The 600-berth marina runs east to west and has a lifeguard station and public beach on the western shoreline. The borders of the marina are rip-rap, while the public beach is an open sandy stretch with little marsh vegetation.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

Most of the site can be treated by truck and hose staged on the paved trail running along the shoreline. However, some spots on the east side of Oyster Point by the corporate park are beyond reach of the hose, as are infestation points within the actual marina. These areas will be treated by backpack sprayer and will be guided by ISP personnel displaying the most recent inventory data on their GPS units.

Site 19e – Oyster Point Park

Site Description

Oyster Point Park is a 33-acre park located immediately south of Oyster Point Marina (Site 19d). This site covers 3.5 acres within the park, including just the small channel that drains to the bay and the channel mouth. The channel runs west to east some 350 meters from Gull Dr. along the base of a steep slope. Marina Boulevard runs along the top of this slope and constitutes the northern border of the park. The mouth of the creek is a mixed marsh habitat with some sandy beach deposits. The entire marsh area at the outlet is surrounded by extensive rip-rap shoreline, which borders grassy parkland on the interior. The site continues south along the shoreline approximately 200 meters to a right-angle bend in the shoreline.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers
- Truck

Treatment Approach:

A truck can be used to treat any hybrid *Spartina* near the shoreline trail on which it can stage. Backpack sprayers will substitute for Argos in the treatment of the main infestation here, the channel. This method is more appropriate now that the infestation is down to a low level and native marsh vegetation is trying to establish that could be damaged by the Argo.

Site 19f – Point San Bruno

Site Description

This site is defined as a 1.7-km stretch of Bay shoreline in South San Francisco extending north approximately 250 m from the northern border of Point San Bruno Park, and south approximately one km from the tip of Point San Bruno to the eastern end of San Bruno Marsh (Site 18g) at the outlet of San Bruno Canal and Colma Creek (Site 18a). This sub-area consists of three main areas of mixed marsh habitat interspersed with sandy beaches. The northern end of this site contains rocky cliff faces fronting the Bay, whereas the southern end contains a shallow marsh bordered by corporate parks to the west. Near the southern extent of the site, a 2.5-acre slice of remnant marsh cuts west about 300 m between two plateaus that are now covered with a new infestation of corporate park.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

SMCMVCD will be able to increase their efficiency at this site in 2011 and beyond by using an airboat to treat the shoreline infestation instead of backpacks. The work will occur at a low or receding tide to maximize dry time. They will deploy applicators with backpack sprayers to treat the remnant marsh patch adjacent to the transfer station.

Site 19g – Seaplane Harbor

Site Description

Seaplane Harbor is a cove in the northeastern corner of San Francisco International Airport (SFO, Site 19h), and contains a heavily developed shoreline with a US Coast Guard Air Station and other airport infrastructure. It is located just south of the City of South San Francisco, with the North Access Road following the western shoreline of the cove from north to south, and the open water of San Francisco Bay immediately to the east. This site also covers the 600 m of pickleweed marsh and sand/shell shoreline from the eastern edge of the SamTrans Peninsula (Site 18e in the Colma Creek complex) to the northern edge of the harbor cove. The shoreline at this site has only limited marsh habitat beyond a high rip-rap border. Seaplane Harbor includes approximately 0.75 acres of marshland habitat that is highly fragmented and varies in depth along the rip-rap edge of the harbor.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

This site has actually been difficult to treat thoroughly in the past because of access issues and fences down to the shoreline. In 2011 and beyond, SMCMVCD will treat this site using an airboat. At the northern end of the site where the infestation is worst, the applicators will need to haul hose out to fully treat any regrowth in the infestation polygons. But along the rest of the shore, the airboat can motor along the edge of the riprap at low tide and spray any scattered plants that are found.

Site 19h – San Francisco International Airport (SFO)

Site Description

The San Francisco Bay shoreline around the perimeter of San Francisco International Airport (SFO) includes seven distinct edges with varying degrees of marsh development based on exposure and accretion, totaling approximately 25 acres. There are two large runway strips that jut out into the Bay, the longer running roughly southeast to northwest with the shorter strips running perpendicular. The largest area of marsh is adjacent to the runways running southwest to northeast along the southern shoreline of SFO, just east of Hwy. 101. This protected cove has accreted substantial sediment and has prograded marsh out as much as 200 m from the concrete and fill. At the Millbrae Avenue security gate to the runways, a large culvert empties a concrete flood control channel that draws

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

stormwater from the airport complex. Two other areas of minimal pickleweed marsh have developed, one on the northeast side of the junction of the two runway strips and the other just south of Seaplane Harbor to the northwest of the shorter runways at the end of the N. Access Road. Both of these face the open Bay, and hence are subject to greater wave energy resulting in less accretion. There are extensive mudflats to the south of the airport complex as well as some shell beach development. Over 500 m of shoreline along Bayfront Park in the City of Millbrae are included in this site, down to the border with the City of Burlingame just north of the mouth of Mills Creek.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

Over the past few seasons, treatment of the only marsh section within this site (the area adjacent to the Millbrae gate south of the runways) has been treated by Argos. After seeing significant reductions in the infestation, SMCMVCD will switch to using backpack sprayers to complete the eradication here. An airboat will be used to treat the rapidly expanding mudflat clones, and will improve efficiency in treating the remainder of the shoreline because the crew can motor along on the mudflat and just come up to the shore when they encounter a hybrid *Spartina* point.

Site 19i – Mills Creek Mouth

Site Description

At the mouth of Mills Creek is a 2.5-acre pickleweed and *S. foliosa* marsh located to the east of Hwy. 101 and the Bayshore Highway, between Mahler Road and Burlway Road in the City of Burlingame. Commercial development borders the site to the north and south with restaurants and hotels to serve the airport community. This site follows the channelized Mills Creek southwest 300 m under Hwy. 101, and then another 400 m under Rollins Road to the Caltrain tracks at California Drive. Included in this site is the bayfront shoreline on either side of the mouth, north to Bayfront Park by SFO and south to the Ramada Inn.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

The shoreline of Mills Creek Mouth is another area that will benefit from the airboat, both in terms of efficiency as well as a reduction in impacts without the need for an Argo. The airboat will move down the mudflats at a low or receding tide and will treat any regrowth from the historical clones or fringe of hybrid *S. alterniflora*. An applicator can deploy from the airboat onto the small marsh at the mouth to treat any remaining hybrid. An applicator with a backpack sprayer will need to take over from there, walking the channel upstream under Bayshore Hwy and up to Hwy 101. They will also head northwest following a ditch along Hwy 101 to treat a few outlier points that have established. Finally, the applicator will drive around to the western side of Hwy 101 and follow the Mills Creek channel up to California Dr. where the last invasive cordgrass plants have colonized.

Site 19j – Easton Creek Mouth

Site Description

The mouth of Easton Creek is located 160 m east of the Bayshore Highway adjacent to the Hwy. 101-Broadway interchange (Exit 419) in the City of Burlingame. The channelized creek runs through high density commercial development, including hotels and restaurants supporting the SFO airport community, and has thin strips of pickleweed on either bank. Along the bayfront south of the mouth, there is a wider band of *S. foliosa* and pickleweed marsh extending south to a cove at the intersection of Airport Blvd. and Bayshore Hwy. The habitat along the shoreline both southeast and north of the creek mouth and cove contains little marsh vegetation below the heavy rip-rap armoring the shoreline.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Airboat
- Backpack sprayers

Treatment Approach:

The strategy for Easton Creek is very similar to that of Mills Creek and is another area that will benefit from the airboat, both in terms of efficiency as well as a reduction in impacts without the need for an Argo. The airboat will move down the mudflats at a low or receding tide and will treat any regrowth from the historical clones or fringe of hybrid *S. alterniflora*. The mudflats off this shoreline are very soft and have historically been a challenge when the crews had to rely on an Argo. As with Mills Creek, an applicator with a backpack sprayer will need to walk the channel upstream under Bayshore Hwy and up to Hwy 101. Finally, the applicator will drive around to the western side of Hwy 101 and follow the Easton Creek channel up to California Dr. where the last invasive cordgrass plants have colonized.

Site 19k – Sanchez Marsh

Site Description

Sanchez Marsh is a 20-acre restored tidal marsh in the City of Burlingame. Hwy. 101 runs along its southern border, with the bridge of Anza Boulevard and the contiguous Burlingame Lagoon (Site 19l) just beyond to the east, and recreation areas including the Burlingame Golf Center and the ball fields of Bayside Park to the north and west. Sanchez Creek flows north through Hillsborough and Burlingame and turns 90 degrees east just before flowing into the western tip of Sanchez Marsh. The site has extensive stands of *Spartina foliosa* in the western portion surrounding large PG&E power line towers that run east-west down the center of the marsh. The majority of the eastern portion is open mudflat at low tide with a meandering channel draining into Burlingame Lagoon and eventually to the bay. Above rip-rap banks on the northern side, the upland slopes to meet a paved recreation trail, while the southern edge of the marsh is mainly pickleweed and gumplant (*Grindelia stricta*). Sanchez Marsh is one of only two sites on the south of the Bay Bridge that contains *Spartina densiflora* in addition to hybrid *S. alterniflora*, the result of a mistake made by an anonymous person that transplanted this bunchgrass from an infestation in Marin.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Airboat
- Amphibious vehicles
- Backpack sprayers
- Manual removal (*S. densiflora*)

Treatment Approach:

Sanchez Marsh is a complicated site for a number of reasons. It has a wide central channel that treatment crews must cross in an Argo or on foot, many of the invasive hybrid clones are at the edge of very soft substrate or are even out in the middle of the mudflat, and the site contains a high proportion of cryptic hybrid morphologies that can easily escape detection until they reach a critical mass. The addition of the airboat to the treatment strategy will be very valuable and will allow the mudflat clones and the hybrid growing in the soft substrate just below the *S. foliosa* fringe to be treated thoroughly. Due to the size of the site, soft substrate and the expected level of infestation, it is anticipated that the Argos will be used in 2011 to treat the remainder. Hopefully efficacy will be high enough that treatment can be completed by backpack sprayers in 2012 to reduce impacts to the marsh.

As mentioned in the site description, this site also has an infestation of *S. densiflora* which is only found in three areas of the west bay. Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped significantly at this site and there are no mature plants remaining. All seedlings or sprouts of *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

Site 19l – Burlingame Lagoon

Site Description

Burlingame Lagoon is a 46-acre tidal lagoon in the City of Burlingame, the majority of which is open water at low tide with scattered mudflat areas. It is bounded to the south by Hwy. 101, to the west by the adjoining Sanchez Marsh and the Anza Boulevard Bridge, and to the east by commercial development on Beach Road and Lang Road. Beyond the rip-rap on the northern border of this site are the extensive parking lots of Anza Airport Parking. The southern edge of the lagoon has the thickest band of pickleweed marsh on the site at the toe of the rip-rap slope, while the rest of the perimeter has a very minimal edge of mixed marsh vegetation. A canal from the northeastern corner runs approximately 400 m north to connect the lagoon to tidal exchange with the bay just beyond the overpass of Airport Blvd. There are five pairs of PG&E powerline towers that run down the center of the marsh; at the eastern three there are 30 m-long earthen berms jutting out from the northern levee that are used for access. This is the second site that includes *S. densiflora* in addition to hybrid *S. alterniflora*, having spread from the neighboring Sanchez Marsh (Site 19k) immediately to the west.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Airboat
- Backpack sprayers
- Manual removal (*S. densiflora*)

Treatment Approach:

Although this lagoon is much larger than Sanchez, the site is much easier to treat because the substrate is firmer and the infestation is relegated to the thin strip of marsh vegetation around the perimeter. The hybrid *S. alterniflora* will be treated using a combination of airboat for any larger patches and backpack sprayers walking along the shoreline and along the channel that branches off to the southeast.

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped significantly at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately.

Site 19m – Fisherman's Park

Site Description

Fisherman's Park is a very small 0.5-acre marsh patch on the shoreline border between the City of Burlingame and City of San Mateo. It is situated in a small corner of the bay bounded to the west and south by Airport Boulevard and to the east by Peninsula Beach of Coyote Point County Recreation Area. There is a section of sand/shell beach which fronts a small pickleweed marsh containing a PG&E electrical tower. The borders of the marsh area are the rip-rap edges of an unpaved recreational trail.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

The hybrid *Spartina* is almost eradicated from this site, and hopefully the 2010 efforts here was the nail in the coffin. If not, an applicator will walk down from the road with a backpack sprayer and treat any regrowth from the old clones that once towered over the mudflat here.

Site 19n – Coyote Point Marina & Marsh

Site Description

This site is located in the Coyote Point Recreation Area in the City of San Mateo, northeast of the Poplar Creek Golf Course. There are several distinct areas encompassed by this site. Along the northern shoreline is San Mateo Point, a rare remaining area of cobble beach with steep cliffs and tall rock outcrops at the water line. To the southeast of this area is the marina, with docks and moorage facilities surrounded by rip-rap levees. The eastern portion of the site consists of a sheltered marsh area surrounded by sand/shell beach berms that form a compressed "U" shape with a wide opening to the Bay. This site includes a brackish pond south of marina parking on the west side of the Bay Trail. ISP recently found a pioneering infestation of hybrid *Spartina* there that was first treated in 2010.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers

Treatment Approach:

The airboat may be able to substitute completely for the use of Argos on the eastern portion of this site, but the complexity of the substrate may dictate that the two methods share the responsibility so time will tell. Any hybrid *Spartina* found within the marina

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

will be treated by backpack sprayer, as will any regrowth on the northern end of the site in the cobble beach at the base of the cliffs.

Site 19o – San Mateo Creek/Ryder Park

Site Description

San Mateo Creek begins up in the San Francisco State Fish & Game Refuge, and emerges from Lower Crystal Springs Reservoir to flow through Hillsborough to its mouth in the newly developed City of San Mateo's Ryder Park just northeast of J. Hart Clinton Drive. The vegetated channel banks are approximately 10-15 m wide, rising from the creek at a moderate slope. The creek flows under a large pedestrian footbridge and out onto long mudflats at the mouth, with no remnant marsh component except for the mixed marsh vegetation below the rip-rap banks. The infestation has worked its way upstream over 1200m to Gateway Park on the west side of Hwy 101 and beyond 3rd Ave. This site also includes a long, brackish lagoon that runs for approximately 1.2 km parallel to the Bay Trail on the inboard side, part of a habitat restoration project to enhance the diversity of habitat in this area.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

The infestation here is well-controlled after several years of intensive treatment and there are no large mudflat clones dispersing seed to the bay. San Mateo Creek will be walked by a couple of applicators with backpack sprayers who can refill if needed from a nurse rig called in to meet them on one of the cross streets. This scenario will also be applied to the brackish lagoon/channel that runs perpendicular to the creek along the Bay Trail. The upstream extent of the infestation in Gateway Park was treated for the first time in 2010.

Site 19p – Seal Slough Mouth

Site Description

The mouth of Seal Slough is located in the City of San Mateo on its eastern border with Foster City. The site begins 200 m upstream of the crossing of J. Hart Clinton Drive and a pedestrian footbridge spanning the channel, at tide gates that restrict water exchange and transform the upstream slough into the sinuous, 6 km-long Marina Lagoon that is lined with residential properties. This portion of the site below the tide gates is characterized by large mudflats that have accreted in the absence of scour from the full volume of the slough. On the downstream side of the bridge to the north, the mouth of the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

waterway opens to a 300 m-wide cove bordered by a 70-acre tidal marsh to the east and the large hillside of Shoreline Park to the west above a heavily armored bank. The marsh contains small channels, mudflats, pans, mid-marsh pickleweed (*Sarcocornia pacifica*) and gumplant (*Grindelia stricta*) stands, sand/shell beach berms along most of the bayfront, and PG&E power line towers anchored in the western marsh edge at the mouth. To the east of the marsh is a recreation complex including the Mariners Point Golf Links. In 2006, CalTrans began a mitigation project by excavating a somewhat sinuous channel to the bay in the southeastern corner of the marsh, and the fresh substrate along the banks was quickly infested from the neighboring site.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayer
- Truck

Treatment Approach:

The main marsh at the heart of this site is more than 50 acres and is still moderately infested. Argos will be continue to be used to treat the infestation here since the marsh does not contain any channels wide enough for airboat access. However, the airboat will be invaluable on the south side of the bridge where the substrate is too soft for the Argos to maneuver without needed to be towed out. The airboat will likely support the Argo applications around the edges of the site and for the patch of marsh on the left bank at the mouth just north of the bridge. A truck will be used for the other areas of the site including the kite surfing area on the east side of the golf course and the infestation in the riprap at the base of the Shoreline Park hill. Finally, a backpack sprayer can be used to treat any seedlings or sprouts along the CalTrans channel to reduce impacts to the newly colonizing native marsh vegetation.

Site 19q – Foster City

Site Description

This site includes approximately 2.5 km of west San Francisco Bay shoreline extending from the San Mateo-Hayward Bridge (Hwy. 92) south to the mouth of Belmont Slough (Site 2a). The Foster City shoreline is heavily reinforced with rip-rap armament, with a paved section of the Bay Trail along the top of the levee and Beach Park Boulevard to the southeast running parallel. Most of this shoreline consists of mudflat at the base of the levee, but two stretches of strip marsh and sand/shell beach have developed. The first

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

extends from just north of Marlin Avenue to just south of Tarpon Street, and the second is across from Bowditch Middle School at Swordfish Street where an area of upland fill juts out from the shoreline. The words “Foster City” have been formed with large rocks on this upland strip, and are clearly visible on the aerial photographs.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Amphibious vehicles
- Backpack sprayers

Treatment Approach:

Due to the length of this site, Argos are still important for efficiency and will likely be used in 2011 if the infestation warrants. The treatment method can shift to backpack sprayer here once the area of the hybrid is reduced sufficiently. The treatment crew will work with ISP personnel with the most current inventory data on their GPS to guide the work, and this could enable the applicators to use backpack sprayers and leap frog down the shoreline with a support truck to shuttle them along.

Site 19r – Anza Lagoon

Site Description

Anza Lagoon is an 11-acre tidal pond within the City of Burlingame that is surrounded by commercial development supporting the SFO airport community including several hotels and restaurants. On the northern side is a 55 m-long break in the heavy rip-rap that connects the lagoon to full tidal exchange. The mixed marsh areas within the lagoon consist of an undulating fringe along the perimeter below the steeply sloping rip-rap edges. A small upland park is located on its northwestern side at the end of Anza Boulevard, from which a pedestrian pathway runs around the periphery of the lagoon. Airport Boulevard runs along the southern end of the site, with Burlingame Lagoon less than 100 m beyond.

Treatment Entity:

San Mateo County Mosquito and Vector Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Almost the entire perimeter of Anza Lagoon was rung with a thick band of hybrid *Spartina* when control efforts began here. That infestation has been reduced down to a few plants and patches scattered around the rim of the lagoon. Applicators with backpack sprayers will treat this site to continue the eradication.

Site 19s – Maple Street Channel

Site Description

The Maple Street Channel site has been added since the 2008-2010 Site-Specific Plans. This channel is located in Redwood City adjacent to the Redwood City Police Department, about 300m north of Hwy 101. The channel runs along Maple Street at approximately eight feet below the elevation of the roadway, and the brackish plant community here indicates some connection to Redwood Creek that is just a stone's throw away.

Treatment Entity:

ISP

Spartina Species Present:

Spartina densiflora

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

In 2010, ISP discovered an established population of very large *S. densiflora* plants on the upper edges of this tidally influenced channel. Most of the plants were located just below the upland edge that is mostly composed of coyote bush (*Baccharis pilularis*). The *S. densiflora* appeared to be planted, both because of the location of the individual plants as well as the fact that the closest population of this invasive cordgrass was Sanchez and Burlingame Lagoons and ISP never found it spreading to adjacent sites from that location. But it was also spreading within the site as evidenced by a number of younger plants closer to the water's edge. The infestation was treated by backpack sprayer in October 2010 soon after its discovery. ISP will return to the site in 2011 to mow away the above ground biomass, and will follow-up by manually removing any plants that sprout.

San Leandro and Hayward Shorelines

TSN:ISP-2005-20

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Complex Description:

The area encompassed by this Site-Specific Plan includes the marshlands of the San Leandro and Hayward shoreline, Alameda County, extending south from the Oakland Metropolitan Golf Links and Oakland International Airport in the north to the San Mateo-Hayward Bridge in the south. A separate Site-Specific Plan for Oro Loma Marsh (TSN:ISP-2004-07) has been developed to specifically address the *Spartina* treatment approaches for that area, and is therefore not included in this Plan. Excluding Oro Loma, there are 23 sub-areas addressed in this plan.

These marshland areas range from large, complex restored marsh systems to channel-bank fringe marsh areas. They line the east shore of the Bay, providing a natural border between the highly urbanized and developed areas of the cities of San Leandro, San Lorenzo, and Hayward and the open waters of the Bay. Much of this area is regularly used for passive recreational activities along portions of the Bay trail, within EBRPD lands, and other trails throughout the area.

The infestations of non-native *Spartina* that constitute the San Leandro and Hayward Shoreline Complex are located along the shoreline in many types of habitats. Invasive *Spartina* can be found along the rip-rap of shoreline fill and levees, in remnant or newly formed pickleweed marsh, along channels emptying into the bay, amongst sand/shell beaches, within large established marsh restoration sites, on shallow Bay-edge mudflats, and in small coves and sheltered marsh areas along the Bay edge. In all sub-areas, where non-native *Spartina* was rapidly expanding into the existing habitat, the infestation has been significantly reduced.

Sub-Area 20a: Oyster Bay Regional Shoreline

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

Site Description

Oyster Bay Regional Shoreline is a 157-acre park managed by the EBRPD that is located just to the south of the Oakland International Airport. The site was formerly a landfill and has been converted to various parkland uses. For the purposes of this plan the Oyster Bay Regional Shoreline sub-area includes two main portions of the shoreline proper. The first is a channel located on the northern shore of the park at the western terminus of Davis Street in San Leandro, on the southern edge of the Oakland International Airport. This area consists of fringing mixed marsh habitat along the channel edges extending out from the filled shoreline. A channel that drains the Oakland Metropolitan Golf Links (Sub-Area 20b) empties into the eastern portion of this area. The second portion of this sub-area is a long channel that runs parallel to Neptune Drive in San Leandro and borders the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

southeastern edge of the park. This area has channel-edge fringing marsh consisting of mixed pickleweed/*Spartina*. For the purposes of this plan, these two areas constitute some 15 acres of marshland.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks
- Helicopter

Treatment Approach:

The northern portion of this infestation has been treated via helicopter in all previous treatment seasons, due to the soft muds that constitute the substrate on the outer edges of the vegetated portion of the marsh. This work has significantly reduced the infestation there and may enable only ground-based treatment methods going forward. In that case, crews working with backpacks or via spray truck would directly treat all non-native *Spartina* found in the marsh.

To the extent that the infestation remains large enough to justify selective aerial treatment, a helicopter will again be used to treat the those portions of the marsh that present sufficiently dense stands of non-native *Spartina* for this method.

Sub-Area 20b: Oakland Metropolitan Golf Links

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

Port of Oakland, 530 Water Street, Oakland, CA 94607. Carol Jones, (510) 627-1132, cjones@portoakland.com.

Oakland Metropolitan Golf Links, 10051 Doolittle Drive, Oakland, CA 94603-1029. Gary Ingram, Golf Course Superintendent, (510) 569-5555x17, gingram@playmetro.com.

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Oakland's Metropolitan Golf Links is a Port of Oakland-owned golf course located just east of the Oakland International Airport, between Airport Drive and Doolittle Drive. For the purposes of this plan, this sub-area only includes the small tidal channel that bisects the southern portion of the course and drains to the bay through Oyster Bay Regional Shoreline (sub-area 20a) and Oakland Airport Shoreline and Channels (sub-area 20r). This small channel contains an estimated 1.0-acre of marsh habitat within thin channel. This channel is known as Zone 13, Line C by ACPWA.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

The channel edges in the golf course can be easily treated via backpack sprayers. Crews will walk the thin band of tidal marsh along the channel banks, treating all non-native *Spartina* found there.

Sub-Area 20c: Dog Bone Marsh

Conservancy Grant Recipient:

City of San Leandro

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

The Dog Bone Marsh sub-area is a small, diked marsh area at the southwestern end of Tony Lema Golf Course in San Leandro. The marsh is adjacent to the Bay edge, and tidal fluctuation is permitted through gated culverts in the levee along the west side of the marsh. The vegetation within this marsh is dominated by *Spartina*, with scattered amounts of pickleweed and other marsh plants along the upper fringe. For the purposes of this plan, this marsh contains 4.2 acres of marshland.

Treatment Entity:

Alameda County Department of Agriculture

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

Dog Bone Marsh is surrounded by maintenance roads and a multi-use recreational pathway, both of which allow direct access to treatment crews using either truck-mounted spray equipment or backpack sprayers. Using either method, spray crews will walk the marsh plain treating all non-native *Spartina* found there.

Sub-Area 20d: Citation Marsh

Conservancy Grant Recipient:

City of San Leandro
California Wildlife Foundation

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

Citation Marsh is a large restored marsh west of the Heron and Misson Bay residential developments of the City of San Leandro at the western terminus of Lewelling Blvd. It is bordered on the north by Estudillo Creek and to the south by Neptune Drive. North Marsh (Sub-area 20f) forms the western border of Citation Marsh. For the purposes of this plan, this marsh is estimated at 112 acres of mixed pickleweed habitat, constructed channels, open mudflat, pans, scattered upland areas, old levee systems and ponded areas. There is a high degree of establishing in this marsh, and its tidal prism is somewhat damped by the fact that it is located inland of several other formerly diked restoration marshes.

Treatment Entity:

Alameda Department of Agriculture
Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

Treatment crews will access the marsh from the access road that separates Citation Marsh from North Marsh, and from the access road that runs along the eastern edge of the upper end of the marsh. An upland berm peninsula that protrudes into the center of Citation Marsh from the east also provides access to the interior portions of the marsh. The majority of the infestation at Citation Marsh can be treated via backpack sprayers supported by spray truck working from these access points. The spray truck will augment backpack-based work where appropriate by treating all plants within reach of the hose reel.

Sub-Area 20e: East Marsh

Conservancy Grant Recipient:

City of San Leandro

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

East Marsh is a medium-sized, formerly diked restored marshland along the western extent of the Heron Bay residential development within the City of San Leandro. To the west, Bunker Marsh (Sub-area 20g) forms the western border, and Citation Marsh (Sub-area 20d) the northern. The San Lorenzo Creek Channel (Sub-area 20h) forms the southern border. For the purposes of this plan, the marsh has been estimated at 45 acres of mixed pickleweed plain, with scattered pans and ponded areas. The marsh drains through a small gate in the levee system along the west side, and much of the eastern and southern portions of the marsh are fairly uniform pickle weed dominated mid to high marsh. There are only a couple of small channels that drain the interior portions of the marsh.

Treatment Entity:

Alameda Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayers
- Trucks

Treatment Approach:

The infestation in east marsh is accessible from an access trail on the west side of the marsh. Treatment crews can pull hose to the small collection of clones that remain in this marsh, or, alternately, use backpack sprayers to treat the plants here.

Sub-Area 20f: North Marsh

Conservancy Grant Recipient:

City of San Leandro
California Wildlife Foundation

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

North Marsh is a large, restored marshland located to the south and east of the Tony Lema Golf Course in the City of San Leandro, to the west of Citation Marsh (Sub-area 20d) and to the north of Bunker Marsh (Sub-area 20g). For the purposes of this plan, this marsh is estimated at 93 acres of constructed channels, open mudflats, pans, scattered upland areas, mixed pickleweed marsh and ponded water, all draining through an open tidal gate in the western levee that borders the site.

Treatment Entity:

Alameda Department of Agriculture
Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks
- Helicopter

Treatment Approach:

North Marsh will be treated in much the same way as Citation Marsh to the east, with the use of backpack sprayers and truck-mounted spray equipment. In the westernmost portion of the marsh, which lies outside of a ¼ mile buffer (from adjacent residential development) for aerial applications, selected aerial applications via helicopter may be

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

used on areas of remaining non-native *Spartina* density. Aerial work will precede ground-based treatments whenever possible.

Sub-Area 20g: Bunker Marsh

Conservancy Grant Recipient:

City of San Leandro

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

Bunker Marsh is a medium-sized marsh on the San Leandro shoreline just north of Robert's Landing and the San Lorenzo Creek Mouth (sub-area 20h), south of North Marsh (Sub-area 20f) and west of East Marsh (Sub-area 20e). This 31.7 acre marsh is surrounded by levees and raised berms and is exposed to full tidal action through a wide breach in the levee system on the south side of the marsh. Bunker Marsh contains several habitat types, including open mudflat in the lower central portion of the marsh, small channels, and large sections of mixed *Spartina*/pickleweed marsh plains.

Treatment Entity:

Alameda County Department of Agriculture

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks
- Helicopter

Treatment Approach:

Bunker Marsh is surrounded by access trails on all sides except the southwest corner where the main channel draining the marsh empties toward San Lorenzo Creek. All areas within the marsh are accessible to ground-based treatment work utilizing backpack sprayers and/or truck-mounted spray equipment. Ground crews will pull hose to target treatment areas within the radius of the hose reel, and backpack crews will work beyond this range. Aerial treatment work may be used on the extreme western end of the marsh (outside of the ¼ mile buffer zone) where non-native *Spartina* density is sufficient to justify the technique.

Sub-Area 20h: San Lorenzo Creek and Mouth

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Conservancy Grant Recipient:

City of San Leandro

Alameda County Department of Public Works-Flood Control District

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

The San Lorenzo Creek and Mouth sub-area encompasses the wide delta that has formed over the last couple of decades at the mouth of San Leandro Creek as well as a portion of the channel itself (known as Zone 2, Line B by ACDPW-FCD). Also known as Robert's Landing, for the purposes of this plan this area is estimated at 44.4 acres of marshland.

The alluvial fan that has formed at the mouth of the channel has rapidly accumulated sediment and vegetation, and in contrast to the conditions present on the site currently, aerial photographs taken of the area in the mid-1980's show very little build up of sediments offshore. Since its formation this delta has been colonized by mixed pickleweed/ *Spartina* stands, with non-native *Spartina* dominating.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Trucks
- Helicopter

Treatment Approach:

As the San Lorenzo Creek and Mouth contain several different habitat types and is broken up into three jurisdictional boundaries, methods for treatment vary. Along the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

banks of the channel upstream of the mouth, treatment crews will use the Argo amphibious vehicle and/or backpacks for treatment work.

At the mouth, where tidal marsh habitat widens on a broad alluvial fan, treatment will involve the use of backpack sprayers and truck-mounted spray equipment for treatment. Aerial applications, which have been used on this site in previous treatment seasons, may again be used if the size or distribution of the infestation justifies this technique.

Sub-Area 20i: Bockmann Channel

Conservancy Grant Recipient:

East Bay Regional Parks District

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, *Weed and Pest Control Supervisor*, (925) 803-7011, *saul@acpwa.org*.

Site Description

Bockmann Channel channel forms the northern boundary of Oro Loma Marsh and runs along the south side of the Oro Loma Sanitation District's water treatment plant. For the purposes of this plan, Bockmann Channel is defined as the mouth of the channel as it enters the Bay just south of the treatment plant in San Lorenzo, and the portion of the channel upstream of the mouth to the tide gates roughly 180 meters upstream, past the maintenance overpass. This sub-area encompasses some 4.7 acres of fringing channel-edge marshland and deltaic low-marsh *Spartina* habitat. This channel is known as Zone 2, Line N by ACDPW-FCD.

Treatment Entity:

Alameda County Department of Agriculture

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Approach:

The Bockmann Creek channel contains limited non-native *Spartina*. Treatment within the channel will be done either via backpack sprayer with the applicator walking the edge of the channel, or via spraytruck driving along the levee.

Sub-Area 20j: Sulphur Creek

Conservancy Grant Recipient:

East Bay Regional Parks District

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and PestControl Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

The tidal portion of Sulfer Creek Channel runs along the southern boundary of Oro Loma Marsh on the Hayward Regional Shoreline, roughly due west of the north end of the Hayward Air Terminal. The channel contains benches of vegetated sediment, especially on the north side, that are dominated by pickleweed with scattered stands of gumplant. This channel is known as Zone 2, Line K by ACDPW-FCD.

Treatment Entity:

Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

The Sulphur Creek channel also contains limited non-native *Spartina*. Treatment within the channel will be done either via backpack sprayer with the applicator walking the edge of the channel, or via spraytruck driving along the levee.

Sub-Area 20k: Hayward Landing

Sub-Area 20l: Johnson's Landing

Sub-Area 20p: Hayward Shoreline Outliers

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

Site Description:

This group of sub-areas describes the roughly 3.2-mile shoreline west of the Bayfront levee system of the Hayward Regional Shoreline, running from the Bockmann Creek Channel in the north to the Hayward-San Mateo Bridge in the south. The bulk of this area consists of broad, open mudflat extending bayward, small deltaic areas formed by the outlets of Bockmann and Sulphur channels, Hayward Landing Canal, and rip-rapped levee edges.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious Vehicles
- Airboat

Treatment Approach:

The Hayward Shoreline has very little non-native *Spartina* remaining as of 2010. Treatment along this area will involve spot-spray applications via backpack. To the extent that soft substrates or clonal patches farther out on mudflats justify the use of either airboat or Argo amphibious vehicle for safe access, these methods may be used to directly treat those areas, or to ferry treatment personnel to the location.

Sub-Area 20m: Cogswell Marsh North (Section A)

Sub-Area 20n: Cogswell Marsh East (Section B)

Sub-Area 20o: Cogswell Marsh South (Section C)

Conservancy Grant Recipient:

East Bay Regional Parks District

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

Site Description

Cogswell Marsh in Hayward consists of three main sections, herein called north, east and south. Cogswell Marsh was opened to full tidal action in 1980 and since that time has developed into a mid to high marsh pickleweed plain dominated by non-native *Spartina*, interspersed with constructed channels. The northern portion of Cogswell Marsh covers a 36-acre area, which drains to the south in a wide mouth that it shares with the adjacent 100-acre Cogswell Marsh East. All of the marshes at Cogswell are surrounded by levees except where they open to the Bay. The southern portion of Cogswell Marsh covers a 52-acre area, which drains to the west in a wide mouth to the Bay. The southern marsh is surrounded on all sides by levees.

The *Spartina* treatments in this marsh have occurred in phases as directed by the US Fish & Wildlife Service. In an effort to minimize any potential for short-term adverse affects to the endangered California clapper rail, the treatments here have been in discrete sections, with a central portion of the eastern section of the marsh remaining untreated through the 2007 Treatment Season. Treatments in 2009 and 2010 have encompassed all locations in each of the three Cogswell Marsh sections.

Treatment Entity:

East Bay Regional Parks District
Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks
- Airboat
- Helicopter

Treatment Approach:

Treatment crews will employ several different treatment methods at Cogswell Marsh. Wherever possible, treatment crews using truck-mounted spray equipment will target those parts of the infestation within the radius of the hose-reel. Backpack work will be used beyond this range.

In order to get to areas of the marsh that are inaccessible from the landward side, or may be more efficiently accessed via the water, the airboat will be used to directly treat plants

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

and to ferry personnel, equipment and supplies deeper into the marsh. Applicators deployed from the airboat will use backpack sprayers to treat beyond the range of the hose reel onboard.

In all previous treatment seasons, aerial treatments via helicopter have been used at Cogswell. This method may again be used wherever the density or distribution of the infestation justifies this technique.

Sub-Area 20q: San Leandro Shoreline Outliers

Conservancy Grant Recipient:

City of San Leandro

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

The San Leandro Shoreline proper, for the purposes of this plan, consists of the westernmost Bayfront edge of San Leandro from the southern end of the Oakland International Airport to the San Lorenzo Creek Channel. There are several types of shoreline habitat along this stretch of the San Francisco Bay, but all are fringing marsh habitat with little plant species diversity. Included within this area is a short stretch of tidal channel north of the EBRPD's Oyster Bay Regional Shoreline Park at the western terminus of Davis Street, and the rip-rap and sandy beach areas south of the San Leandro Marina.

Treatment Entity:

Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

All of the San Leandro Shoreline outliers are accessible by access/maintenance roads for treatment. Treatment crews will use these access routes to treat the edges of the shoreline wherever non-native *Spartina* patches are found.

Sub-Area 20r: Oakland Airport Shoreline and Channels

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

Port of Oakland, 530 Water Street, Oakland, CA 94607. Carol Jones, (510) 627-1132, cjones@portoakland.com.

Site Description

This sub-area is composed of the highly developed shoreline surrounding the Oakland International Airport. This area includes channel-edge fringe marsh habitat, rip-rapped bay fill, shallow marsh pan areas adjacent to the airport's main runway, and a mixed marsh fringe surrounding a small mudflat area bounded by a sand dune upland transition. The entire area is controlled by the Port of Oakland with special access permissions required by the Federal Aviation Administration (FAA).

There are four main areas of infestation along the border of the airport. The first and largest portion of the infestation lies in the southeast corner of the airport, where it borders East Bay Regional Parks District's Oyster Bay Regional Shoreline Park, and the Port of Oakland's Oakland Metropolitan Golf Links. The infestation here is found in a marsh running roughly east-west, bordered by a low, rip-rapped levee on its upper edge and open mudflats below.

The second area is composed of a handful of scattered clones along and within the rip-rap that composes the southern edge of the airport. The clones here are small and can be accessed via the maintenance road that runs along the top of the levee.

The third area of infestation lies just north of the main runway of the airport, in a low area of brackish pans bordered by pickleweed and saltgrass marsh. The clones are located amongst native *Spartina* stands.

The fourth (second largest area of infestation at the airport) is located on the northernmost portion of the airport property. This is a tidal wetland area composed of restored marshland and a north-south running channel with a tidal-gate outlet on the north end. The area is bordered by a sand dune complex to the west and commercial development to the east. Historically, the non-native *Spartina* in this area is composed of large, circular clones inhabiting the pickleweed/*Spartina* zone in the marsh.

Treatment Entity:

Private contractor via competitive bidding

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Backpack sprayers

Treatment Approach:

All areas of the airport have reduced infestations that can be treated via backpack sprayers. In all areas, treatment personnel will walk the bay edge or marsh edge treating all non-native *Spartina* found there.

Sub-Area 20s: Hayward Area Recreation and Park District (HARD) Marsh

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

Site Description

This marsh area is a restored tidal marsh that was opened to tidal action in the late 1980's. Much of the marsh is dominated by wide, open mudflats at low tide, while the dominate vegetation over the remainder of the site is pickleweed. Numerous low upland islands are scattered throughout the marsh, which is surrounded by trails that can be accessed via the EBRPD Hayward Shoreline Interpretive Center located at the western end of Breakwater Avenue in Hayward.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Airboat

Treatment Approach:

Treatment personnel will use backpack sprayers to treat all non-native *Spartina* found in this marsh. If non-native *Spartina* is found in areas where treatment via airboat is more efficient, or where treatment by ground is not possible, the airboat will be used for access.

Sub-Area 20t: San Leandro Marina

Conservancy Grant Recipient:

City of San Leandro

Site Responsible Entity:

City of San Leandro, 835 East 14th Street, San Leandro CA, 94577, *Delmarie Snodgrass*, (510) 297-5197, dsnodgrass@ci.san-leandro.ca.us.

Site Description

The San Leandro Marina consists of a public park, Marina Park, located off Monarch Bay Drive near Fairway Drive, which is a 30-acre regional park that borders the San Leandro Shoreline. The San Leandro Marina is part of the San Leandro Shoreline Recreation Area. The marina is a full service marina with 455 berths, a free launch ramp and two yacht clubs. The shoreline of the marina is essentially made of steep rip-rap fill edges, with very little true tidal marsh habitat development.

Treatment Entity:

Alameda County Department of Agriculture

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Trucks

Treatment Approach:

The developed edge of the San Leandro Marina is easily accessible from the roads, trails and parking lots that abut the shoreline. Treatment crews will use backpack sprayers or truck-mounted spray equipment to target all non-native *Spartina* found along the Marina shoreline.

Sub-Area 20u: Estudillo Creek Channel

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The main tidal reach of Estudillo Creek Channel runs from Wicks Ave in San Leandro west to the Bayfront. There are essentially three main sub-divisions of the channel in the area: 1) the mouth of the channel upstream for roughly 180 meters to a set of tidal gates, 2) the 1,200 meter channelized portion of the creek upstream of the tidal gates to a railroad crossing and, 3) upstream of the railroad crossing to Wicks Avenue in San Leandro including two main branches that diverge above the crossing. The tidal marsh habitat within this channel consists of steep fringing channel edges bordered with mud bottoms and topped with upland weedy annuals. This channel is known as Zone 13, Line A by ACDPW-FCD.

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Trucks

Treatment Approach:

The levees that line Estudillo Creek are topped by maintenance roads on both sides. These roads will be used by spray truck crews and/or Argo amphibious vehicles to access the target areas along the Creek channel. Using either backpack sprayers or Argo, spray crews will treat all non-native *Spartina* found within the thin fringing tidal marsh between the mudflat of the channel proper and the slopes of the levees.

Sub-Area 20v: Hayward Landing Canal

Conservancy Grant Recipient:

Alameda County Department of Public Works-Flood Control District

Site Responsible Entity:

County of Alameda Public Works Agency, 4825 Gleason Drive, Dublin, CA 94568; *Saul Ferdan*, Weed and Pest Control Supervisor, (925) 803-7011, saul@acpwa.org.

Site Description

Hayward Landing Canal channel drains into the Bay at Hayward Landing, and the tidal portion of the channel continues roughly 1,200 meters upstream past the EBRPD Winton Ave maintenance facility where the channel bends to the south. The channel edges contain mixed marsh vegetation, with benches of sediment on mainly the north side. This channel is known as Zone 4, Line A by ACDPW-FCD.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

Alameda County Department of Public Works-Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers
- Amphibious vehicles
- Trucks

Treatment Approach:

Very little non-native *Spartina* remains along the banks of this channel. What does remain will be treated using Argo amphibious vehicle or via backpack sprayer. Spray trucks will support either technique working from access roads that line the channel.

Sub-Area 20w: Triangle Marsh

Conservancy Grant Recipient:

East Bay Regional Parks District

Site Responsible Entity:

East Bay Regional Parks District (EBRPD), 2950 Peralta Oaks Court, Oakland CA 94605-0381; *Peter Alexander*, (510) 544-2342.

Site Description

Triangle Marsh is a tidal marsh dominated by pickleweed and containing several meandering channels located between Cogswell Marsh to the south and Oro Loma Marsh to the north, both highly infested systems, with Cogswell Marsh being one of the most heavily infested marshes in the bay. Additionally, Triangle Marsh has its main tidal exchange directly adjacent to the mouth of the channel at Hayward Landing, also an area with an established population of non-native *Spartina*. However, until 2007, Triangle Marsh remained *Spartina*-free. Small, scattered plants represent the nature of the infestation in this marsh.

Treatment Entity:

East Bay Regional Parks District

Spartina Species Present:

Spartina alterniflora x foliosa

Treatment Timing:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

July 1 through end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Treatment crews will use backpack sprayers to treat the small amount of non-native *Spartina* in this marsh. Crews will walk the marsh plain treating all non-native *Spartina* found there.

Ideal Marsh

TSN: ISP-2005-21

Site 21a & b – Ideal Marsh North & South

Conservancy Grant Recipient:

U.S. Fish & Wildlife Service

Site Responsible Entity:

U.S. Fish & Wildlife Service, Don Edwards National Wildlife Refuge, 1 Marshland Rd., Fremont, CA, 94605; Joy Albertson, (510) 792-0222 x 131, joy_albertson@fws.gov.

Site Description

Ideal Marsh is a 180-acre wetland restoration site located on the eastern shore of the San Francisco Bay Estuary that was allowed to naturally restore to unrestricted daily tidal exchange. The site is bordered to the north by the mouth of the Alameda Flood Control Channel (Site 1a), with the shoreline marshes of Ideal extending approximately 2.5 miles south to a point within a mile of the Dumbarton Bridge where the levee road at the corner of Pond N4 cuts back west to the shoreline. Levees along the eastern edge of this site separate it from the decommissioned salt evaporator ponds.

Ideal Marsh North is a thin strip marsh that invasive *Spartina* had accreted at the toe of the levee along Ponds N2A and N4A. The marsh is not continuous but rather exists in several clumps spaced along the shore that support pickleweed and other native marsh plant species along with remnant patches of non-native *Spartina*.

In comparison, Ideal Marsh South is a fully-vegetated restoration site with natural marsh features including a variety of channel types and numerous pans scattered across the southern marsh plain. The site is about 200-300 m wide over much of its length with a bulb on the southeast corner that widens the marsh to about 420 m at its southern border along the levees of Pond N4. The main channel for the site enters in the northwestern corner, runs along the levee on the northern border and turns to run south along the levee with Pond N5 to the east.

Treatment Entity:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

U.S. Fish & Wildlife Service

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Airboat
- Amphibious vehicles
- Backpack sprayers

Treatment Approach:

Treatment crews will use backpack sprayers and amphibious vehicles to move through the marsh plain treating all hybrid *Spartina alterniflora* found there. Where possible, the amphibious vehicle will use the levee to the east of the marsh to move materials and personnel to treatment sites within the marsh. The hybrid *S. alterniflora* here is spread fairly evenly throughout the marsh plain, necessitating covering the entirety of the marsh on the ground.

The airboat may be used to give treatment crews access to deeper areas of the marsh where necessary, or to directly spray dense stands of plants that remain in the marsh.

Two Points Complex

TSN: ISP-2005-22

Conservancy Grant Recipient:

California Wildlife Foundation (Sites 22a-f) & California Department of Parks & Recreation (Site 22f)

Site Responsible Entities:

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeoundation.org.

California Department of Parks and Recreation, Diablo Vista District, 845 Casa Grande Road, Petaluma, CA 94954; Christina Freeman, Environmental Scientist, (707) 769.5652 ext 209, cfreeman@parks.ca.gov.

Site Complex Description

The Two Points Complex refers to a series of tidal marshes and shoreline areas in northeastern San Francisco Bay and southeastern San Pablo Bay. The complex stretches from Albany & the Contra Costa County border in the south, up around Point San Pablo,

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

through the Richmond marsh complex to Giant Marsh, and continuing up the shoreline to the north on the eastern side of Point Pinole Regional Shoreline ending in Rodeo. With the exception of two restored tidal marshes and some large mudflat areas, this complex is along heavily developed shoreline containing light and heavy industrial land use as well as some housing and several small marinas. The segment north of Point San Pablo includes some large remnant pickleweed (*Sarcocornia pacifica*) and *Spartina foliosa* marshes that are recovering from numerous abusive commercial enterprises in the 19th and 20th centuries including explosives manufacturing. These marshes are adjacent to heavy industry, including a Chevron refinery and a chemical manufacturing plant, as well as a regional landfill and transfer station. Point Pinole Regional Shoreline is an East Bay Regional Park District holding that is covered under a separate ISP Site-Specific Plan (Site 10). The hybrid *Spartina alterniflora* around San Pablo and Wildcat Creeks has a disproportionate amount of cryptic plants that have made comprehensive treatment difficult. The majority of these plants were found to senesce ahead of the baywide average, some as early as mid-August, at which point an herbicide application will be ineffective.

Site 22a – Wildcat Marsh

Site Description

Wildcat Marsh (also known as Chevron Marsh) is a 350-acre marsh located at the mouth of Wildcat Creek on the shores of southeastern San Pablo Bay, immediately north of the Point Richmond peninsula. There is a large tract of marsh to the east of Wildcat Creek that is bordered on the north by the West County Landfill and Transfer Station on a peninsula jutting out into the bay. On the west side of Wildcat Creek is a narrow peninsula of pickleweed and *S. foliosa* marsh bordered to the west by an extensive mudflat cove and the Chevron refinery at the base of the Point Richmond peninsula.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

Historically, the infestation at this site has been primarily on the edges of the narrow peninsula on the left bank at the mouth of Wildcat Creek, with some scattered points along the banks stretching upstream approximately 500m. Those infestations were largely controlled in the first years of ISP, but some spots have bounced back, probably because

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

of the cryptic morphologies that aren't clearly distinguishable until later in the season, combined with the need to treat this site early ahead of premature senescence. An area of moderate infestation was detected in 2009 in the thin cove at the eastern base of the peninsula, along with a few sixable clones on a small marsh fragment 565m west of the peninsula along the edge of refinery complex. This site will continue to be treated by airboat since the majority of the infestation is not accessible by land. Very little hybrid *Spartina* has been detected in the main marsh east of the creek mouth, with only a few points along the banks up to the northwest corner at the base of the landfill hill. Since the channels in this marsh are too narrow for the airboat, and there is a PG&E boardwalk running through it, backpack sprayers would be used to treat any invasive cordgrass found here in the future.

Site 22b – San Pablo Marsh

Site Description

San Pablo Marsh is a 165-acre marsh at the mouth of San Pablo Creek on the City of Richmond shoreline in southeastern San Pablo Bay. Most of the marsh is located east of the creek, but there is also a 475 m-long marsh peninsula west of the mouth. The West County Landfill and Transfer Station borders the marsh to the southwest, with the Richmond Sanitary District and other recycling operations to the south of the marsh on the east side of San Pablo Creek. There are a series of old, crumbling levees from some defunct commercial enterprise that run above the banks of the creek and also extend out from this southern marsh edge. These berms are being reclaimed by the marsh and are densely vegetated with gumplant (*Grindelia stricta*) that favors this slightly higher elevation. San Pablo Marsh is predominantly pickleweed with some *S. foliosa* on the bayfront and in the channels. The marsh stretches east to an 11-acre pickleweed, *S. foliosa* and alkali bulrush (*Bolboschoenus maritimus*) cove bordered by levees on either side, located behind the Richmond Rod and Gun Club rifle range. The northern levee here serves as a gravel road out to the club's RV park, skeet shooting range, and boat launch. This sub-area extends upstream from the mouth of San Pablo Creek on both banks to just past the bridge used to access the landfill from Parr Blvd, and on up to Richmond Parkway. The southeastern lobe of San Pablo Marsh is bordered by Richmond Parkway and contains PG&E transmission lines, towers, and a boardwalk at the end of the decommissioned Freethy Blvd. cul-de-sac.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: August 1 through the end of treatment season

Treatment Methods:

- Airboat

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Amphibious vehicle
- Backpack sprayers

Treatment Approach:

San Pablo Marsh is a large site that had a high degree of hybrid *Spartina alterniflora* infestation throughout all habitat zones when ISP treatment began here. Probably the most impressive level of infestation was found out on the mudflats in the eastern portion, along with the monoculture in the neighboring cove behind the Richmond Rod & Gun Club. These are also the areas mentioned in the Site Complex Description that senesced far ahead of the average baywide phenology, thwarting treatment efforts for two years because the plants were brown by mid-August. Throughout the rest of the site, the *Spartina* was relegated to areas of high water flow, namely filling up the small channels and creating a fringe meadow along the shoreline.

Airboat work has been essential to the huge reduction in hybrid *Spartina* that has occurred here over the past three years at this site, and this will continue to be the primary treatment method. The airboat is well-suited to work on the open mud at a low or receding tide, treating the scattered remnants of the mudflat infestation right from the deck or deploying onto the marsh to haul hose out to powerspray the fringe and up the higher order channels. The airboat will also be used to treat the infestation along the banks of San Pablo Creek from the mouth upstream 975m to the bridge to the transfer station.

To reach the higher elevation areas beyond reach of the hose in the eastern portion of the site, the applicators will use a combination of Argo and backpack sprayers. The Argo will be driven out to centralized locations using the upland levees, and the applicators will haul hose around to treat the areas still at a moderate level of infestation. This greatly improves efficiency because the 25 gal capacity of the Argo is equivalent to eight backpacks and requires no return trips to a nurse rig. Backpack sprayers will be used for all the scattered patches in the farther reaches of the site to reduce impacts from the Argo, and there is a PG&E boardwalk that can be used to cross the wider channels or to return to the nurse rig more efficiently. Applicators will also be deployed from the airboat to treat the upper reaches of the small channels at the center of the site just east of San Pablo Creek, as well as any scattered plants remaining in the two channels within the marsh west of the creek and the new areas of spread above the Parr Blvd bridge scattered amongst dense stands of alkali bulrush.

Site 22c – Rheem Creek Marsh

Site Description

This 15-acre strip marsh is located at the mouth of Rheem Creek in southeastern San Pablo Bay along the Richmond shoreline, approximately one mile south of the Point Pinole Regional Shoreline. At the northern end of the sub-area, just south of Giant Marsh, is a 300-m long meandering rock jetty that protects a cove of pickleweed (*Sarcocornia pacifica*) and *S. foliosa*, and separates this marsh pocket from the main strip marsh to the south. Another manmade rock levee borders the site to the south, and serves as a storage lot for large shipping containers used by some as housing. This sub-area also includes

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

two more small marsh patches to the west and southwest that are bounded by levees within the Richmond Rod & Gun Club property. In the upland to the east is the model plane airstrip for the Bay Area Radio Control Society (BARCS).

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers

Treatment Approach:

The majority of the infestation at this site is well-controlled, comprised of single stems or small patches of hybrid (often with bright red stems from flower to base) scattered amongst the extensive *S. foliosa* fringe stretching south from the jetty to the Richmond Rod & Gun Club. However in 2010, the small cove north of the jetty was found to contain some large patches of cryptic hybrid that had not previously been detected until this year of high spring rainfall. The infestation throughout this site has always been small enough to efficiently treat using simply backpack sprayers, but the expansion seen in this small cove justified a method that would employ a powersprayer due to the height and diameter of the clones. Since the airboat was on site for San Pablo Marsh already, it was utilized on the hybrid in this cove; that scenario will be replicated in 2011 if ISP inventory of the northern cove shows that the infestation has not been sufficiently reduced. Otherwise the entire site will be treated by backpack sprayer.

Site 22d – Stege Marsh

Site Description

The 6-acre Stege Marsh is located on the Richmond Inner Harbor, bordered by the Richmond Marina on the west and Hoffman Marsh (Site 22e) and the Point Isabel Regional Shoreline to the southeast, with I-580 running along the upland edge approximately 500 meters from the marsh, through the City of Richmond. The site is part of Eastshore State Park, which is jointly managed by California State Parks and East Bay Regional Parks District (EBRPD). Stege Marsh includes a remediation site funded by Cherokee Simeon Venture LLC, which involved excavation and removal of sediments contaminated by former chemical and pesticide manufacturing on the site. New habitat features have also been added as part of the overall restoration, including about 3.5 acres of new marsh habitat and a freshwater lagoon. The Watershed Project is actively involved in the stewardship and continued restoration of Stege Marsh, including planting pockets of

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

native *Spartina foliosa* on the mid-elevation mudflats of an inner cove to the north of the Bay Trail that bisects the site.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

The hybrid *S. alterniflora* at Stege is well-controlled with just a handful of spots scattered across the site. Most of the infestation lies south of the Bay Trail that runs across the site, but there is also some hybrid to the north including several spots along Meeker Slough and one patch on the northeast end. The site will continue to be treated by backpack sprayer with ISP personnel guiding the applicators with the most recent inventory data on their GPS.

Site 22e – Hoffman Marsh

Site Description

The 35-acre Hoffman Marsh is set back several hundred meters from the Richmond Inner Harbor in the City of Richmond, and is bordered by Rydin Road and commercial development on the west, Point Isabel Regional Shoreline to the south, and I-580 running along the eastern edge just 50 meters from the marsh. Hoffman Marsh was recently restored to muted tidal exchange, and some new channels were excavated in the process. There is a straight 600 m-long channel that connects Hoffman to the tidal influence of the Bay. The interior channels in the southern half of the site are lined with thick stands of gumplank (*Grindelia stricta*), while the northern half has very little. This site contains extensive patches of *S. foliosa* surrounded by a matrix of pickleweed (*Sarcocornia pacifica*).

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Methods:

- Backpack sprayers

Treatment Approach:

This site was very close to eradication in 2010, with just a few blades of hybrid *Spartina* present in the historical area of infestation. A backpack sprayer will be used if retreatment is needed to complete this local eradication, or if any pioneering invasive cordgrass is found elsewhere in the marsh.

Site 22f – Richmond/Albany/Pinole Shoreline

Site Description

This site stretches from Golden Gate Fields and the Albany Bulb in the southeast, along the shoreline of the Albany mudflats, Point Isabel Regional Shoreline, and the highly developed waterfront of South Richmond, out to Point San Pablo in the northwest. The site has been expanded to include a few new outlier clones discovered in 2008/2009; after leap frogging over the other Two Points marshes (Wildcat, San Pablo and Rheem), as well as the Point Pinole complex, sub-area 22f resumes to include the bayfront and channels of Pinole Shores, Hercules and Rodeo. Much of the southeastern section is part of Eastshore State Park, which is jointly managed by California State Parks and East Bay Regional Parks District (EBRPD). The Albany/South Richmond Shoreline site includes about 35 km of shoreline, much of it adjacent to residential, commercial or light industrial development. Long stretches are composed of armored shoreline with rip-rap or concrete to counteract erosion. There are some thin strip marsh areas composed mainly of pickleweed (*Sarcocornia pacifica*), with saltgrass (*Distichlis spicata*) along the upper edge. Some shallow coves can be found on the southern shoreline on either side of Point Molate, and they contain vulnerable mudflat habitat. Brooks Island Bird Sanctuary lies approximately 500 meters off the mainland near the center of the site. There are a number of oil tanker piers jutting out into the Bay along the shoreline from Point Richmond to Point San Pablo.

Treatment Entity:

California Wildlife Foundation & California Department of Parks & Recreation
(contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

State Parks is only responsible for treating the area of Eastshore State Park within this ISP site, which includes the very lightly-infested Albany cove bordered to the south by Golden Gate Fields and to the north by Pt. Isabel Regional Shoreline. If any retreatment of sprouts is required in 2011 or beyond, or if new pioneering clones are detected, they will be treated by backpack sprayer.

All other invasive cordgrass within the boundaries of this site will be treated by a contractor selected by CWF. The largest infestation within Site 22f is located in Castro Cove just north of the landfall of the Richmond/San Rafael Bridge. This area appeared to be under control after applications in 2008 & 2009, but the high rainfall in 2010 energized the plants and allowed ISP to distinguish the true extent of the hybrid assimilation here. It was powersprayed in 2010 but will most likely be appropriate for backpack sprayers to complete the eradication. The rest of the historical infestation consists of individual plants or small patches scattered over the 35km of shoreline. Most of these points are along the shoreline east of Point Pinole up to the old Rodeo Marina, and all can be adequately managed by backpack sprayer.

A new small infestation was detected in 2010 within the Point San Pablo Yacht Harbor north of the Chevron refinery and northwest of Wildcat Marsh. Several hybrid points were mapped by ISP at varying levels of species identification confidence. This area will be monitored closely and will be treated by backpack sprayer as needed.

Marin Outliers Complex **TSN: ISP-2005-23**

Conservancy Grant Recipient:

California Wildlife Foundation (Sites 23a-n) & California Department of Parks & Recreation (Site 23o)

Site Responsible Entities:

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeoundation.org.

California Department of Parks and Recreation, Marin District, 845 Casa Grande Road, Petaluma, CA 94954; Bree Hardcastle, Environmental Scientist, (707) 769.5665 ext 207, bhardcastle@parks.ca.gov.

Site Complex Description

The Marin Outliers is a site complex composed of smaller, disparate sites scattered throughout the shoreline and marshes of eastern Marin County. This complex stretches some 12 miles from the southernmost site in Sausalito that consists of some remnant marsh patches adjacent to the marinas, to the northernmost in Novato that is a large, intact marsh just south of Hamilton Field. The Marin Outliers sites are highly diverse, ranging from coves of native *Spartina foliosa* adjacent to residential properties, to the rip-

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

rap shoreline adjacent to light industry or marinas, to restored and intact remnant marshes. There are three other separate Site-Specific Plans for tidal areas of Marin not included here: the large Corte Madera Creek complex (Site 4), and the individual sites Blackie's Pasture (Site 3) and Pickleweed Park (Site 9).

Site 23a – Brickyard Cove

Site Description

Brickyard Cove is a shoreline area to the east of Point San Pedro Road in eastern San Rafael adjacent to McNear Brick & Block, one of the oldest brickyards in the Bay Area, which has been in operation since 1868. At first glance the shoreline appears to be composed of rocky substrate, but in fact most of it is old brick embedded in the sandy mudflats. There is a thin band of marshland that contains scattered clumps of pickleweed (*Sarcocornia pacifica*), alkali heath (*Frankenia salina*), and stands of *Spartina foliosa*.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina densiflora was not found on the site in 2010 and may be locally eradicated
Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

If any *S. densiflora* is found at Brickyard Cove, it will be removed manually. ISP biologists will survey the site twice annually in May/June and again in Nov/Dec to ensure that no seedlings or resprouts are missed.

Site 23b – Beach Drive

Site Description

This sub-area actually consists of two very different marsh systems on either side of Beach Drive, which is a small residential street to the south of Point San Pedro Road in eastern San Rafael. To the southwest is a narrow, 100 m-wide cove which extends about 450 m to the northwest from San Rafael Canal behind a row of residential properties on Beach Drive and Point San Pedro Road. This cove has a significant and expanding presence of native *Spartina foliosa* and non-native hybrid *S. alterniflora* with an associated increase in the accretion of sediment in recent years. Across the road to the east is a small 3-acre muted tidal marsh composed of pickleweed, gumplant (*Grindelia stricta*) and native *Spartina* in some of the small channels. The upper edge of this marsh abuts residential properties at the base of a steep hill, and the seepage and runoff of freshwater have allowed brackish marsh vegetation to establish such as alkali bulrush (*Bolboschoenus maritimus*). The Bayside Acres Homeowners Association has been

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

involved with the *Spartina* control efforts around Beach Drive since the first season of treatment, and they post the treatment schedule on their website for interested residents to view.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Airboat
- Backpack sprayers
- Truck

Treatment Approach:

From 2005 to 2009, the main infestation at this site in the cove has been combatted using a combination of a long nozzle attachment on the end of hose hauled from a truck staged along the road. This was necessitated by the very soft mud under and around these houses and the fact that the hybrid *S. alterniflora* could colonize way out on the mudflat.

Backpack sprayers were also utilized on the firmer substrate around the edges and even from the decks of landowners that were hopeful that the invasive cordgrass could be eliminated so they could once again launch kayaks from their little docks. Although there has been improvement in the situation, progress has been slow and it did not appear that the site was on the trajectory to eradication using those treatment methods.

In 2010, ISP consulted with the Bayside Acres Homeowners Association and decided to change the treatment strategy at the Beach Drive cove. With the need for a higher volume application directly to the clones out in the softer mud, an airboat was the perfect tool for the job and there is a boat launch immediately adjacent to the site at Loch Lomond. This method did indeed work very well and virtually eliminated the need for additional backpack work because the applicator hauled hose around to the edge infestation. It is anticipated that ISP will utilize this treatment method again in 2011 and possibly 2012 if there are still any hybrid *S. alterniflora* plants that are beyond reach for adequate treatment. At some point the method will shift back to truck and/or backpack when these methods will produce adequate results.

The small marsh across Beach Drive from the cove is a much simpler system, although cryptic *Spartina* that has colonized this site has sometimes escaped detection. However the treatment method is adequate for achieving local eradication at this site and backpack sprayers will continue to be utilized until that goal is reached.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site 23c – Loch Lomond Marina

Site Description

The Loch Lomond Marina is located off Point San Pedro Road in San Rafael, with Beach Drive (Sub-area 23b) immediately to the east. This site consists of a narrow fringe of marsh vegetation along the shoreline of a cove to the west of the marina, and along the rip-rap inside of the protective marina levee on the western, southern and eastern edges. Pat Lopez, the Harbormaster for the marina, provides access permission for ISP to conduct its treatment work.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

The infestation within Loch Lomond Marina is small but widely scattered. The site will be inventoried by ISP and the data collected will be used to guide applicators with backpack sprayers to treat the plants, if necessary.

Site 23d – San Rafael Canal Mouth

Site Description

This sub-area consists of two separate sections, the northern shoreline of the San Rafael Canal to the east of Sea Way, and a 3-acre *Spartina foliosa* cove west of Summit Avenue adjacent to the Marin Yacht Club immediately to the west. The shoreline section begins at a small marsh at the end of Sea Way where it meets the canal, and runs east for approximately 750 m along the rocky shoreline at the base of the steep cliffs to Loch Lomond Marina. Perched atop these cliffs are the enormous personal estates on Bay Wy. in San Rafael, but most of these properties do not have a means of accessing the shoreline. The second section is a cove dominated by *S. foliosa* that extends inland about 200 m to the north, and has a 50 m-wide mouth along the canal. A deep channel runs down the center of this marsh, denying easy access from the eastern side along Summit Ave. to the western half which is reached from the Marin Yacht Club.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina densiflora
Spartina densiflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

The high spring rainfall in 2010 revealed several clusters of cryptic hybrid *S. alterniflora* and the upper edges of the *S. foliosa* cove adjacent to the Marin Yacht Club. This enabled ISP to target these plants before they assimilated more of the native cordgrass and established large clones similar to what was found here and controlled in 2007 & 2008. The pioneering infestation is still small and received a follow-up application on missed plants late in 2010. Backpack sprayers will continue to be used to treat this site as well as any outlier plants along the canal that may be detected in the future.

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped significantly at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately, as will any hybrid *S. densiflora* since they should be small enough to dig.

Site 23e – Muzzi & Martas Marshes

Site Description

Muzzi Marsh was once part of a historic marsh plain that extended several miles along Corte Madera Creek upstream to Ross Valley. A local developer (Muzzi) diked 200 acres in the 1950's, which subsequently subsided as it dried out and killed the salt marsh vegetation. When the Larkspur Ferry Terminal was constructed in the early 1970's, the Golden Gate Bridge, Highway and Transportation District (GGBHTD) used the site for both mitigation (eastern 130 acres) and the disposal of dredge spoils (western 70-acre portion). In 1976, the eastern dike was breached in four places to restore tidal action to Muzzi, and an extensive meander system has developed, extending off the relict tidal drainage. The site began to establish marsh vegetation within one year of the breaching, but the plant community remains fairly homogeneous today, dominated by a large pickleweed (*Sarcocornia pacifica*) plain and extensive areas of native *Spartina foliosa*. The eroding marsh scarp on the eastern shore is very pronounced, dropping sharply several meters down to mudflat elevation; stretches of the southern Muzzi Marsh have

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

developed a sand/shell berm along the top of the scarp that is well-drained enough to support a pioneering infestation of pampas grass (*Cortaderia selloana*) which is not a salt marsh species but has a huge propagule source nearby.

Muzzi Marsh actually includes two separate marshes to the north and south with the broad channel of Marsh Creek running east-west between them and breached dikes around both perimeters. Included in this sub-area is also a small, 15-acre fragment of muted tidal marsh known as Marta's Marsh that borders Muzzi to the south. Much of the interior of Marta's is still unvegetated mudflat, but the higher elevation edges of the site within the dikes contain pickleweed and some other native marsh plant species.

The two marshes of this sub-area are bordered by San Clemente Creek to the south, with the residential properties of Corte Madera beyond. To the north is an undiked remnant of ancient marsh known as the Corte Madera Ecological Reserve (Site 4a), formerly known as Heerdt Marsh, that stretches up to the mouth of Corte Madera Creek. A large upland area created by the 750,000 cubic meters of dredge spoils generated by the Larkspur Ferry Terminal construction borders Muzzi to the west, and this area has been heavily infested with pampas grass. Beyond are some permanently ponded areas, and the commercial development of Corte Madera along Hwy. 101.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina densiflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

The eastern half of Muzzi is very difficult to access on the ground, especially with equipment for treatment, so ISP uses a small boat that can be launched from the canal that divides CMER from Muzzi. Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately, as will any hybrid *S. densiflora* since they should be small enough to dig.

Another trip will be made out to Muzzi and Martas mid to late summer to treat the pioneering infestation of hybrid *S. alterniflora* that has been knocked down to very low levels. The boat will be used to transport two applicators with backpack sprayers that will use the ISP's most recent inventory data on GPS to navigate to the widely-scattered infestation points.

Site 23f – Paradise Cay

Site Description

Paradise Cay is a housing development on the eastern Tiburon Peninsula constructed so the backyard of most residential parcels contains a dock on a series of manmade canals that are open to the tides. The northern end of the complex is home to the Tiburon Yacht Club. There is a very thin band of marsh vegetation (mostly pickleweed) along these canals at the toe of the rip-rap on which the houses were built. In the southwest corner is a small, narrow cove about 100 m long and 20 m wide between the development to the east and the base of the steep mainland slope below Paradise Drive. The infestation in this cove is hybrid *S. alterniflora* while the remainder is *S. densiflora* associated with the private residential parcels; it has been an ongoing process contacting these landowners and receiving access permission to control the cordgrass, and a handful have never responded. These holdouts may need to be handed over to the Marin Agricultural Commissioner for enforcement of the State Noxious Weed Law.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina densiflora

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

The cove that used to be stuffed with hybrid *S. alterniflora* has been eliminated and in 2010 there were only a few sprigs that needed treatment. Backpack sprayer will continue to be the treatment method; manual removal from the extremely soft mud in this cove

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

would be very difficult, as would ensuring that any digging has not left behind a broken rhizome that will spur vegetative growth.

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site. Only a handful of mature plants remain on properties where the landowners have not responded to letters requesting access to remove the infestation. All seedlings or sprouts of *S. densiflora* found throughout this site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year by kayak to allow a view of the shoreline. Any properties with *S. densiflora* found during these surveys will be contacted immediately and either the landowner or an ISP representative will manually remove the plant.

Site 23g – Greenwood Cove

Site Description

Greenwood Cove is located in north-central Richardson Bay, east of Strawberry Point. This area contains extensive mudflats with a thin band of marsh vegetation including pickleweed, alkali bulrush (*Bolboschoenus maritimus*), and native *Spartina foliosa*. The surrounding land use is high-density residential, with condominiums and apartments lining the shoreline of the cove. There is also a small, 2.5-acre restoration marsh adjacent to Strawberry Point Elementary to the west of the main cove.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina densiflora

Spartina densiflora x *foliosa*

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayer
- Manual removal

Treatment Approach:

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

immediately, as will any hybrid *S. densiflora* since they should be small enough to dig. Backpack sprayers will only be needed if larger patches of hybrid are discovered.

Site 23h – Strawberry Point

Site Description

Strawberry Point is a narrow peninsula protruding south into the center of Richardson Bay west of the Tiburon Peninsula, with extensive mudflats offshore to the east. There is a thin finger of land along the eastern side that runs almost the entire length of the peninsula and creates a narrow embayment between it and the mainland. This finger, known as Strawberry Spit, contains large residential houses on the southern half and the 17-acre marshy, hook-shaped Aramburu Island to the north. Aramburu was originally part of Strawberry Spit that was created in the 1950s and 1960s using fill from hillslope excavation for the homes that now line the shore as well as dredge spoils from local operations to keep the navigational channels open. The site became a haul out area for harbor seals in the 1970s but they left shortly after a channel was excavated in 1987 to create a wildlife refuge as mitigation for the development of the southern half of the spit. There are two smaller islands north of Aramburu, a tiny 0.4-acre piece of remnant marsh that is part of four privately-owned parcels that stretch across the channel from the mainland, and a three acre island at the north end of the cove. Both of the smaller islands are somewhat intact, with *S. densiflora* as their only invasive plant species, but Aramburu shows the scars of more intensive historical land use and contains large infestations of ice plant, French broom, and fennel along the upland edges of its marsh and sandy beach systems. The infestation at Strawberry Point is predominantly *S. densiflora* with a few instances of individual hybrid *S. alterniflora* clones, mostly in the armored banks near the houses in the south.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina densiflora
Spartina densiflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season
S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayer
- Manual removal

Treatment Approach:

Overall, the infestation of invasive cordgrass within the boundaries of this site is very small. Since ISP began implementing a more aggressive IVM (Integrated Vegetation

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The *S. densiflora* at Strawberry Point is located mainly on the islands, so the site will be accessed by boat and then surveyed on the ground by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately, as will any hybrid *S. densiflora* since they should be small enough to dig. There are some infestation points on the private parcels along the shoreline adjacent to these islands, and ISP will continue to work with landowners here for access to eradicate their infestations.

The small amount of hybrid *S. alterniflora* remaining at this site will be treated by backpack sprayer. This pertains mainly to the clones in the riprap along the eastern shore at the south end of the site, but two other points of this “species” of *Spartina* have also been detected in the northern half of the site.

Site 23i – Strawberry Cove

Site Description

Strawberry Cove, also referred to as Seminary Cove, is a 10.5-acre tidal marsh at the base of DeSilva Island, nestled between Strawberry Point to the east and Hwy. 101 to the west. The marsh drains to a large mudflat area in northwestern Richardson Bay. West of the marsh are commercial properties along Hwy. 101. This pickleweed and *S. foliosa* marsh is owned by the DeSilva Island Homeowners Association, and the road up to these hilltop condominiums runs along the southern edge of the marsh.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayer

Treatment Approach:

When treatment began here several years ago, there was just one enormous clone that stretched across a channel in the southwestern corner of the site. The first application killed at least 70% of that clone, but there has been some hybrid sprouting from the footprint of that enormous root mass ever since, and in 2010 another hybrid clone was detected close by that was probably hiding amongst the *S. foliosa* with a cryptic morphology for several seasons. The treatment method at Strawberry Cove will continue

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

to be backpack sprayer. Because this site has many acres of healthy, native *S. foliosa* to search for pioneering hybrid plants, a comprehensive inventory must be conducted ahead of treatment to keep this site on the trajectory to eradication.

Site 23j – Bothin Marsh

Site Description

Bothin Marsh Open Space Preserve is a large, multi-use park within the Marin County Open Space District located in the northwestern corner of Richardson Bay west of Hwy 101 in Mill Valley. The park has a tidal marsh component of over 100 acres, including tidal channels snaking through pickleweed plains, expansive mudflats in Pickleweed Inlet to the east and south, thin strip marshes of pickleweed and *Spartina foliosa* along the paved trails, and other small fragmented pickleweed, gumplant (*Grindelia stricta*), and alkali bulrush (*Bolboschoenus maritimus*) marshes.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayer

Treatment Approach:

Historically, there has really only been one main area of infestation at Bothin Marsh, an area of about 0.7 acre along the Bay Trail adjacent to a water treatment plant. The hybrid *S. alterniflora* here is growing in a shallowly ponded area at the upper end of a tidal ditch, and had a very strange morphology. These plants were very short for hybrid, and they senesced far ahead of the baywide average phenology. These factors inhibited effective treatment for a few seasons, but the infestation has now been well-controlled and is down to a handful of stems and a small patch or two. Unfortunately, a 100m² patch of robust hybrid amongst a matrix of native cordgrass was finally detected and treated in 2010 to the northeast across the footbridge and adjacent to Hauke Park. It appears that the cryptic hybrids by the footbridge and in the tidal ditches at the south end of Bothin have been eliminated. The treatment method at this site will continue to be backpack sprayer.

Site 23k – Sausalito

Site Description

Sausalito is home to world famous marinas, and its shoreline has been largely developed to accommodate recreation and other commercial interests. The remnant tidal marshes and mudflats are scattered in small, fragmented pockets between docks, light industry, office buildings, and small upland parks.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

These hybrids had the same morphology and phenology as the larger *Bothin* infestation described above and thwarted initial control efforts with early senescence, leaving brown plants that would not uptake and translocate the herbicide. The two historical infestations of hybrid *S. alterniflora* at this site have now been well-controlled over several years of treatment; one was down to just a few stems in 2010 and the larger one has been reduced to a few scattered patches. Two other pioneering clones were discovered in 2009 and these were eliminated in just one treatment; however, another cryptic clone was discovered at the north end of this site and treated for the first time in 2010. Backpack sprayers will continue to be used to pursue the eradication of hybrid cordgrass at this site.

Site 231 – Starkweather Park

Site Description

Formerly known as Shoreline Park, this City of San Rafael open space area was renamed the Jean and John Starkweather Shoreline Park in 2003 to honor these conservation activists. Located in southeastern San Rafael, the park consists of several restored tidal marshes, two permanent ponds, and a 2250-m trail atop the rip-rap of the heavily fortified shoreline. The main area of Starkweather Park for ISP purposes is the 8.5-acre restored tidal marsh located approximately one km from the western landfall of the Richmond-San Rafael Bridge north of San Quentin. This marsh wraps around the eastern side of the office park at Pelican Way and Glacier Point. It contains a developing perimeter of pickleweed (*Sarcocornia pacifica*) and an extensive meadow of *S. foliosa*, with a lower elevation interior of mudflat. The infestation here is comprised primarily of *S. densiflora*, but several patches of hybrid *S. densiflora* have also been discovered as well as some hybrid *S. alterniflora* on the outboard side of the levee and Bay Trail.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina densiflora

Spartina densiflora x foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina foliosa

Treatment Timing:

S. densiflora and hybrid: May/June and again Nov/Dec

Treatment Methods:

- Manual removal

Treatment Approach:

Since ISP began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped dramatically at this site and there are no mature plants remaining. Herbicide applications in the initial years removed most of the mature plants, and manual efforts took care of the rest. All seedlings or sprouts of *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during these surveys will be removed immediately, as will any hybrid *S. densiflora* since they should be small enough to dig.

Site 23m – Novato

Site Description

This sub-area is comprised of a 180-acre remnant marsh in southwestern San Pablo Bay bordered to the north by the Hamilton Wetland Restoration Project at the decommissioned Hamilton Air Force Base in the City of Novato. This marsh is part of an intact tidal marsh complex that continues south 1.6 km to Gallinas Creek, the Santa Venetia Marsh Reserve, and the northern edge of the ancient, relatively-unaltered China Camp Marsh. The Novato site is within a broad, 300 m-wide pickleweed (*Sarcocornia pacifica*) marsh with well-developed channels and a wide fringe of *S. foliosa* meadow along the bayfront below the short marsh plain scarp. A manmade channel runs parallel to the north-south levee on the western edge of the marsh. This site contained a pioneering infestation of hybrid *S. alterniflora* that was discovered very early by ISP before it could establish a significant presence.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

- Backpack sprayer

Treatment Approach:

This large marsh was home to a very small infestation of hybrid *S. alterniflora* that is now down to the final stems. A low pressure sprayer (either backpack or one-gallon pump) will be used to complete the local eradication here.

Site 23n – Triangle Marsh

Site Description

Triangle Marsh is a 13-acre slice of remnant tidal marsh north of Paradise Drive in the Town of Corte Madera. The site was purchased by Marin Audubon Society in 2000 and has undergone ecological restoration with funding from Caltrans to remove fill, grade and contour areas to the appropriate marsh elevations, and plant the upland areas with natives. The salt marsh was quickly colonized by native plants such as pickleweed (*Sarcocornia pacifica*), gumplant (*Grindelia stricta*), and *Spartina foliosa*, but is still very vulnerable to invasion. This site extends 400 meters along the shoreline to the east to include the thin fringe marsh adjacent to Marin Country Day School and a small, one acre block of marsh along the Bay Trail at Marin Montessori School. The infestation at this site is primarily hybrid *S. alterniflora*, although the small marsh beside Marin Montessori also contains *S. densiflora* and there is one private property adjacent to the school that has obviously planted *S. densiflora* purposefully, and has failed to respond to letters to remove the plants.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina densiflora

Spartina densiflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

S. densiflora: May/June and again Nov/Dec

Treatment Methods:

- Backpack sprayers
- Manual removal

Treatment Approach:

The hybrid *S. alterniflora* within Triangle Marsh is very close to eradication and may not require treatment in 2011. However there are still sprouts from the larger clones that once grew along the shoreline off Marin Country Day School and the Marin Montessori. These will be treated by backpack sprayer if they continue to return.

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

In the small marsh at Marin Montessori, ISP continues to find seedlings of *S. densiflora* from the seed bank, and these will be removed manually. A small patch of hybrid *S. densiflora* was treated with herbicide here in 2010 and may be small enough to dig if it returns at all in the future. Finally, a private residential parcel east of this marsh has planted and cultivated some *S. densiflora*, and they have failed to respond to several letters over the years. They may be handed over to the Marin Agricultural Commissioner for enforcement of the State Noxious Weed law so access can be gained to remove the plants and this seed source.

Site 23o – China Camp State Park

Site Description

China Camp is located on the western shores of San Pablo Bay nestled between Gallinas Creek to the north and eastern San Rafael to the south. There are over 100 acres of tidal marsh habitat, including expansive stands of unspoiled native *S. foliosa*, and the site is well-known as one of the last remaining ancient marshes in the San Francisco Bay estuary. China Camp has also preserved a feature that is even rarer, an intact transition zone from salt marsh to oak woodland and grassland in a time in history when most of the remaining tidal marsh in San Francisco Bay is bounded by levees and fragmented from any substantial upland habitat. These transition zones are instead where residential and commercial construction has occurred, and in many cases the adjacent marsh was also filled for development. In addition to being an ecological treasure, China Camp also preserves part of the cultural heritage of the area. There was a Chinese shrimp-fishing village here in the mid-1800s after the gold rush, and the Coast Miwok had settled this area thousands of years ago and benefited from its natural bounty.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayer

Treatment Approach:

The pioneering infestation at this site is a high priority for an aggressive IVM treatment strategy that will ensure that both the mature plant's rhizome is killed, and also that any satellite populations that have spread from that infestation are detected and also killed. The historic clone should be surveyed in June for its status and any necessary response should be rapidly delivered using a backpack sprayer. China Camp will be revisited in August by ISP personnel for a complete inventory after most California clapper rails are off their nests. If any new populations of invasive cordgrass are discovered, they will be

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

treated by backpack sprayer. The original clone will be checked for impacts from the May/June treatment and any necessary follow-up treatment will occur at this time.

Petaluma River Complex

TSN:ISP-2005-24

Complex Description

The area encompassed by this Site-Specific Plan includes approximately 4,500 acres of marshland and riparian habitat within the Petaluma River Watershed. The City of Petaluma, at the confluence of the Petaluma River and Lynch Creek, forms the northern boundary of this plan, with San Pablo Bay forming the southern boundary at the mouth.

This site consists of a complex mosaic of historic tidal marsh habitat, developed shoreline, brackish tidal riparian edge zones, maintained pastureland, restoration sites, light industrial facilities and urban development. The largest component of this site is the 3,900-acre Petaluma Marsh, one of the largest historic tidal marshes in the entire Estuary.

The pioneering infestation of *Spartina alterniflora* hybrids in the Petaluma River Complex remains very limited in its distribution. The majority of the infestation is located adjacent to a dredging and barge dock facility just downstream of Highway 101 south of Petaluma, with scattered infestations located upstream and downstream this central core.

Sub-Area 24a: Petaluma River-Lynch Creek Confluence to Grey's Field

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California State Lands Commission
City of Petaluma

Site Description

This sub-area of the Petaluma River Complex is centered around the City of Petaluma, and much of this area is heavily developed shoreline with rip-rapped or filled riverside. There is heavy and light industry in the area, as well as commercial districts, docks and marinas, and an overpass for Hwy 101. The northern portion of the property is defined by the confluence of the main river system and Lynch Creek, and the southern boundary is at the northwestern end of the restoration marsh known as Grey's Field. A portion of this area includes Schollenberger Park, a restored wetland within the City of Petaluma.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Airboat

Treatment Approach:

Treatment crews will work from the River channel at a low or medium tide, spraying any non-native *Spartina* found along the channel banks. As of 2010, the remaining non-native *Spartina* along this stretch of the channel was reduced to a dozen or so remnant clonal patches.

Sub-Area 24b: Grey's Field

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

City of Petaluma

Site Description

Sub-Area 24b is located downstream of Shollenberger Park on the east side of the Petaluma River and includes the area on the east side of the river known as Grey's Field. This marsh area is a newly restored brackish tidal wetland, with wide, shallow, un-vegetated mudflats encompassing some 150 acres. The majority of vegetation establishment at this site is confined to the edges of the marsh.

Treatment Entity:

Private contractor via competitive bid

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Airboat
- Backpack

Treatment Approach:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

There has only been a single mapped 'possible' hybrid *Spartina* clone in this marsh, and it was treated in 2009 via airboat. No non-native *Spartina* was found in this marsh in 2010. Nevertheless, should any non-native *Spartina* be discovered in Grey's field in subsequent years, one of two treatment methods can be used depending upon the location of the target plants. An airboat can be used in the interior portion of the marsh where soft muds will not allow for ground-based access to target plants. Around the accessible periphery of the marsh, treatment could be done via backpack sprayer.

Sub-Area 24c: Petaluma Marsh

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California Department of Fish and Game Central Coast Region, PO Box 47 Yountville, CA 94599; John Krause, Associate Wildlife Biologist, (415) 454-8050, jkrause@dfg.ca.gov

Site Description

For the purposes of this plan, the Petaluma Marsh sub-area encompasses the roughly 4000 acres of marshland located from the southern end of the restoration marsh called Grey's Field in the north to the outlet of San Antonio Creek in the south. This area includes all marshlands on both sides of the Petaluma River. The largest portion of this sub-area is the Petaluma Marsh proper, the largest intact marsh system in the San Francisco Bay Estuary. This marsh contains numerous sloughs, pans, small channels, mid-marsh vegetation and other habitats.

Treatment Entity:

Private contractor via competitive bid

***Spartina* Species Present:**

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Boat
- Backpack

Treatment Approach:

The large size of this marsh and the many channels that meander through the area require the use of watercraft to access the area. Since treatment of non-native *Spartina* must occur at low tide, an airboat is perfect for work within the marsh. Some areas of the

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

marsh may be too difficult to access via airboat if any further non-native *Spartina* is found, and other types of boat may be used to ferry applicators to treatment areas. Once there, treatment may occur from the boat itself, or via backpack-equipped personnel deployed on foot to areas deeper within the marsh.

Sub-Area 24d: Lower Petaluma River: San Antonio Creek to River Mouth

Conservancy Grant Recipient:

California Wildlife Foundation

Site Responsible Entity:

California State Lands Commission

Site Description

Lower Petaluma River (Sub-area 24d) is a 225-acre stretch of riverside salt marsh habitat from the confluence of the Petaluma River and San Antonio Creek to the mouth of the river. Within this area are large sloughs such as Black John Slough and wide marsh areas extending back from the river's edge to the cultivated farmland beyond.

Treatment Entity:

Alameda County Department of Public Works – Flood Control District

Spartina Species Present:

Spartina alterniflora x foliosa

Spartina foliosa

Treatment Timing:

July 1 through end of treatment season

Treatment Methods:

- Airboat
- Backpack

Treatment Approach:

No non-native *Spartina* has yet been found in this stretch of the Petaluma River Watershed. Should any be discovered, treatment will be done via airboat, or via backpack-equipped personnel deployed to treatment areas via airboat (or by ground if possible).

North San Pablo Bay Complex TSN: ISP-2008-26

Conservancy Grant Recipient:

California Wildlife Foundation (Sites 26a,c,d) & USFWS (Site 26b)

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

Site Responsible Entities:

California Wildlife Foundation, 1212 Broadway, Suite 840, Oakland, CA 94612; Amy Larson, 510.208.4438, alarson@californiawildlifeoundation.org.

U.S. Fish & Wildlife Service, Don Edwards National Wildlife Refuge, 1 Marshland Rd., Fremont, CA, 94605; Joy Albertson, (510) 792-0222 x 131, joy_albertson@fws.gov.

Site Complex Description

The complex includes approximately 5,500 acres of historic marshland, restored marshland, riparian habitat and developed shoreline within the Napa River Watershed and along the northern shoreline of San Pablo Bay. The Cities of Vallejo and American Canyon have tidal marsh property within this complex, as does the US Fish and Wildlife Service within the San Pablo Bay National Wildlife Refuge and the US Navy at Mare Island.

The pioneering infestation of *Spartina alterniflora* hybrids in the North San Pablo Bay complex is still very limited in its distribution. The infestations within this part of the Bay are limited to the shoreline of Mare Island and within the new marsh at White Slough.

Site 26a – White Slough/Napa River

Site Description

White Slough marsh is a roughly 135-acre restored tidal marsh that lies to the east of Highway 37 and west of Sonoma Boulevard in the city of Vallejo. The marsh is a sparsely vegetated tidal marsh in the initial stages of colonization. The majority of the area is open mudflat with tidally inundated low sections. The periphery of the marsh is composed of scattered pickleweed (*Sarcocornia pacifica*) and a small amount of native *Spartina foliosa*, with a dense stand of *Schoenoplectus californicus* (tule) in the northern lobe. A section of the Bay Trail runs along the western border adjacent to a tall sound wall for Hwy. 37, and this area has been extensively landscaped with native plants by CalTrans.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

Spartina Species Present:

Possibly no *Spartina alterniflora* x *foliosa* remaining
Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

The original infestation here was identified purely by genetic analysis because the plants themselves were very cryptic and had been field identified as native *S. foliosa*. Those plants were treated for two seasons were eliminated from the site. Any new detections should be small, pioneering plants that would be treated by backpack sprayer or even manually removed.

Site 26b – San Pablo Bay National Wildlife Refuge & Mare Island

Site Description

The San Pablo Bay National Wildlife Refuge lies along the north shore of San Pablo Bay in Sonoma, Solano, and Napa Counties. The refuge includes long stretches of tidal marsh, extensive mudflats, and seasonal and managed wetland habitats. Mare Island was the site of the Mare Island Naval Shipyard, located to the west of the City of Vallejo. The western side of this peninsula contains a broad band of mixed pickleweed and *Spartina foliosa* marsh that is roughly 4 miles long and up to 1.5 miles wide, extending westward toward the Sonoma River mouth from the mouth of the Napa River. The refuge provides critical migratory and wintering habitat for shorebirds and waterfowl, particularly diving ducks, and provides year-round habitat for endangered, threatened, and sensitive species like the California clapper rail, salt marsh harvest mouse, California black rail, San Pablo song sparrow, and Suisun shrew.

Treatment Entity:

USFWS

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina densiflora

Spartina foliosa

Treatment Timing:

S. densiflora: May/June and again Nov/Dec

Hybrid *S. alterniflora*: July 1 through the end of treatment season

Treatment Methods:

- Backpack sprayer
- Manual removal

Treatment Approach:

Since ISP and USFWS began implementing a more aggressive IVM (Integrated Vegetation Management) treatment strategy on *Spartina densiflora* in 2008, the infestation of that species has dropped significantly at this site and there are no mature plants remaining. All seedlings or young *S. densiflora* found on the site will continue to be removed manually. The site will be surveyed by ISP biologists and USFWS twice a year, once in May/June when the flower stalk can help spot small *S. densiflora* amongst the native marsh vegetation, and a second time in Nov/Dec when the pickleweed is red and *S. densiflora* is dark green and tends to stand out. Any *S. densiflora* found during

Exhibit 10: Draft Site-Specific Treatment Plans for 2011-2015

these surveys will be removed immediately, as will any hybrid *S. densiflora* that may be found since they should be small enough to dig.

The infestation of hybrid *S. alterniflora* along the Refuge shoreline is small and occurs in scattered pockets. While the clones establishing far out on the sandy mudflats gave ISP pause at first, they have been examined more closely by airboat and appear to be native *S. foliosa* that closely resembles the fringe marsh adjacent to the clones. The infestation that requires treatment is close to shore, and the sandy substrate just below the marsh scarp is very firm, so backpack sprayer is all that is required. Due to the length of the overall site, USFWS utilizes an ATV to move parallel along the shore and transport either a backpack sprayer for the hybrid *S. alterniflora* or digging equipment and removed plants for manual work on *S. densiflora*.

Site 26c – Sonoma Creek

Site Description

Sonoma Creek is a tidal slough located at the center of the north shore of San Pablo Bay, about 1.7 km west of the Sears Point Bridge over the Napa River and 1.9 km east of the mouth of the Petaluma River. This watercourse drains a complex mosaic of land that has been diked for agriculture where the Skaggs Island Naval Reservation once stood. Sonoma Creek is approximately 110 m wide where Hwy. 37 crosses, containing steep mud slopes exposed at low tide that transition to a continuous fringe band of native *Spartina foliosa* below narrow bands of pickleweed marsh. CDFG parking areas on either side of the bridge provide access for fishing and other recreational uses.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

Initially the hybrid *Spartina alterniflora* near the mouth of Sonoma Creek thwarted effective treatment because it senesced ahead of the baywide average and would not uptake and translocate the herbicide. In 2010, an airboat was used to access the clones at low tide, allowing the applicator to treat the full face of the plants from the water and also to deploy onto the marsh to achieve full coverage from the other side. With the reduction anticipated from this application, coupled with the easy ground access to the plants, backpack sprayer should be sufficient to eradicate these plants moving forward.

Site 26d – Sonoma Baylands

Site Description

This restoration project of the Sonoma Land Trust and California Coastal Conservancy is located on the northwest shore of San Pablo Bay on the left bank at the mouth of the Petaluma River. The 320-acre site sits on an old hayfield that had subsided up to six feet since it had been levied off. Over 2 million cubic yards of dredge spoils were shipped in from deepening projects on the Petaluma River and Oakland Inner Harbor. Sonoma Baylands was returned to tidal exchange in 1996 and provides important habitat for a wide variety of shorebirds and waterfowl. Vegetation has colonized rapidly and this may accelerate as sediment is accreted out on the mudflats. This site will be a very important one for ISP to watch with how well known the threat of hybrid *Spartina* is to young restoration marshes.

Treatment Entity:

California Wildlife Foundation (contractor TBD/competitive bid)

***Spartina* Species Present:**

Spartina alterniflora x *foliosa*

Spartina foliosa

Treatment Timing:

Hybrid *S. alterniflora*: June 1 through the end of treatment season

Treatment Methods:

- Backpack sprayers

Treatment Approach:

A single mature clone approximately 6m in diameter was found and treated at this site in 2010. This clone was most likely developing as a cryptic hybrid for several years, and the high spring rainfall in 2010 and subsequent vigorous growth probably helped ISP detection. However, this raises the chance that propagules have been dispersed and that other hybrid plants are developing within this site that have not yet been detected. The existing clone is a very high priority for eradication in this vulnerable system and will be surveyed by ISP early in treatment season and any regrowth will be treated by backpack sprayer if necessary. A full inventory of the site by ISP personnel will follow later in the season ahead of seed set to determine if any pioneering satellite hybrids are present, and the first clone will also be examined at this time to assess if the herbicide application was sufficient or if some degree of retreatment is needed. Since this infestation was caught early, it appears that backpack sprayer will be a sufficient treatment method to bring about eradication.